OCT 17 1923

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLIX
Number 15

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, OCTOBER 11, 1923

Thirty-five cents a copy
Three dollars a year

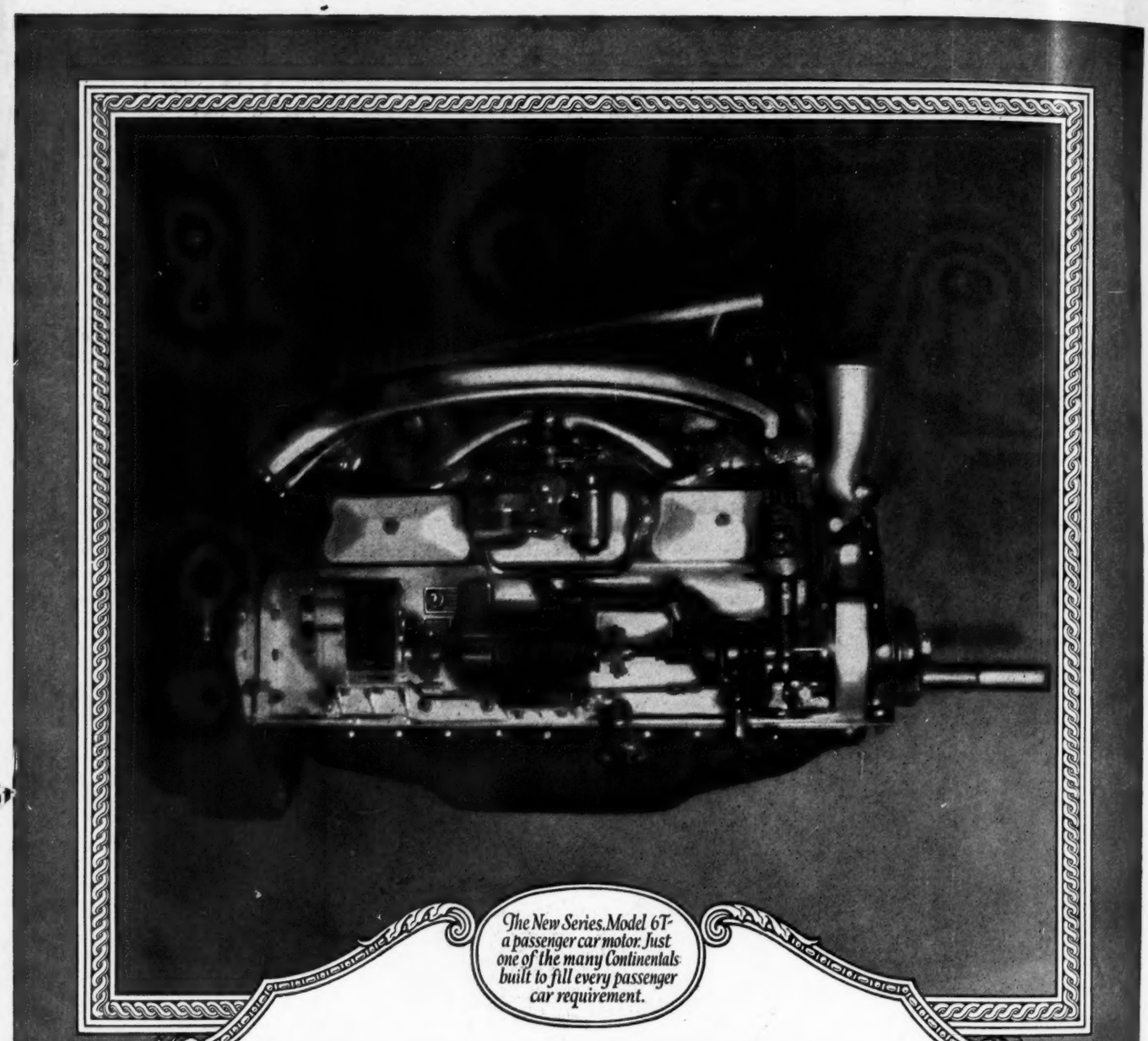
Motor Wheel supplies wheels for more makes of cars than any other wheel manufacturer

Motor Wheel PRODUCTS

MOTOR WHEEL CORPORATION, *LANSING, MICHIGAN*

Tuarc - Disteel - Forsyth

Entered as second class matter Jan. 2, 1903, at the post office at New York, N. Y., under Act of March 3, 1879.



The New Series Model 6T-a passenger car motor. Just one of the many Continentals built to fill every passenger car requirement.

THERE is but one plant in the world—the Continental Motors Corporation—where eight thousand specialists concentrate their skill and experience upon the manufacture of high quality passenger car and truck motors. The recognized symbol of this motor specialization is and always will be—the Continental Red Seal.

Built by the largest motor Specialists in the world

CONTINENTAL MOTORS CORPORATION

Detroit and Muskegon, Michigan

CONTINENTAL MOTORS
Powerful as the Nation
AMERICA'S STANDARD

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIX NEW YORK—THURSDAY, OCTOBER 11, 1923 No. 15

Use of Buses by Traction Lines Is Warmly Advocated

Trackless Transportation Committee of American Electric Ry. Assn. stresses their advantages. Points to obligation of providing best service possible. Warns against insistence on too heavy special taxes. Advises cooperation with N. A. C. C.

"The constantly growing use of bus service by electric railway companies gives this association a direct and vital interest in the questions of special taxation and traffic regulation affecting motor vehicles in general. In this connection, cooperative action with the automotive vehicle association is desirable."

THIS pronouncement, advocating a surprising change in policy, is contained in the report of the committee on trackless transportation presented to the American Electric Railway Association at its convention in Atlantic City last week.

It means that this committee, headed by H. B. Flowers, president of New Orleans Public Service, Inc., and including a dozen of the most prominent electric railroad executives in the country, has become convinced, after a thorough investigation, that there is a distinct place for the motor bus in the traction field. In the language of the report:

"We need the motor bus to feed and supplement our car lines, to open up new territory; in fact, to complete, round out and make whole passenger transportation on the highway."

Street car companies, ancient and bitter foes of the motor vehicle, have accepted at last the contention of the automotive industry that they should make the bus an ally rather than an enemy. They have found that the public is hungry for service of this kind and that they might better provide it themselves than let it pass into the hands of competitors.

The report marks another long forward step in the real coordination of transportation. The far-sighted men in the traction field have decided that it may be wise to think twice before advocating heavier taxes on motor vehicle common carriers when they are entering that field themselves on a large scale.

The report, which is of importance to every man in the automotive industry, follows:

THE experience of the industry during the past year has been to confirm the findings of the committee contained in its 1922 report. The answers made to the questionnaires sent out this year by the committee of the Transportation and Traffic Association indicate that the adoption of bus service by electric railways has been of a character and for the reasons set forth in our 1922 committee report. This experience in general confirms the fact that bus operation is on the average more expensive per bus or seat-mile than electric car operation, but that the higher unit cost is justified where traffic is light.

The committee's conclusion last year that "the possibilities of development of transportation with railless vehicles should interest the industry greatly," has been justified by the fact that in the intervening year (from June, 1922, to June, 1923), the number

of electric railway companies to adopt busses for part of their service has increased from 44 to 95 and the number of busses involved from 300 to 925.

The committee on bus operation of the Transportation and Traffic Association has prepared an excellent report this year, giving the results of a study of the extent, costs, reasons for and methods of bus operation by electric railway members of the American Electric Railway Association.

We believe that the same social and economic forces which have already caused the adoption of auxiliary bus service by 95 electric railways in this country will continue to expand their use in the future, and that the association should arrange for the coming year to continue the study of the operating, engineering and accounting details of bus service.

THE constantly growing use of bus service by electric railway companies gives this association a direct and vital interest in the questions of special taxation and traffic regulations affecting motor vehicles in general. In this connection cooperative action with the automotive vehicle association is desirable.

Another feature which should be of interest to the association is the provisions of State laws and the attitude of State commissioners as to the regulation of competition with electric railways or the operation of busses by electric railways.

In its last report your committee stated in substance that there was a field for the economic use of busses to supplement the electric railway service in the cities of this country, either by inaugurating bus service on lines of light traffic, where track reconstruction was the other alternative, or by using busses for extending service into new territory where the expected traffic was not great enough to warrant the investment in tracks for electric railway service.

Your committee also concluded that for handling mass transportation the electric railway is the most reliable and economical method now known, but that on account of the availability of busses for the special conditions above stated, the electric railways should be alive to the possibilities of bus operation—both in order to handle all the transportation needs of their community and by so doing to prevent wasteful competition by others entering the field due to the electric railways failing to utilize busses where the need for them exists.

The fact that during the past year the number of electric railway companies operating auxiliary bus service has increased from 44 to 95, involving an increase in busses from 300 to 925, proves that an increasing number of street railway companies are finding places where busses can be used to advantage in supplementing their rail service.

EXPERIENCE has shown that the motor bus amalgamates well with street railway transportation. It decidedly helps in providing a unified service in which the various companies are trying to provide street transportation. The menace of the jitney, although still with us, has grown less. Particularly has it become apparent during the past year that after the street railway has installed motor bus operation the public has come to realize how much more satisfactory is the service than that previously rendered by various irresponsible, poorly organized jitney companies.

This has been largely due to the adoption by the street railways of the best constructed and designed busses to be found on the market. They have been well maintained, cleaned, painted, and run on schedules of frequent and evenly spaced headway from early in the morning until late at night. All this has been a welcome change in many communities.

The automotive industry has progressed in the past few years and is now developing passenger carrying vehicles of improved design. We are advised that the larger manufacturers of busses have appropriated large sums for the further improvement of bus design for passenger transportation service. There is a field in transportation in which these vehicles can furnish satisfactory service and traction officials should not allow an antagonism, aroused by jitney competition, to cause them to lose sight of the fact that it is their duty to supply transportation in the territory in which they are operating, and if extensions are required or present high costs of reconstruction necessitate the abandonment of any track, they should be quick to consider trackless transportation. The electric railways must keep pace with the development in the transportation field if they expect to continue to be the recognized distributing agency of the transportation commodity in their territory.

Failure on the part of traction companies to recognize and meet the above-described situation will result, as it has in the past, in encouraging independent operators to enter the field and meet these service requirements. Better far for the traction companies and the public to realize fully that duplication of service is detrimental in that it results in a higher cost for transportation, making it desirable that the traction companies shall remain the transportation agency of the community, giving the public what it wants if the request is reasonable and the need apparent. Duplication of service is always ultimately paid for by the passenger, and under proper regulation it is to the interest of the passengers that highway transportation shall be conducted as a unified whole.

FROM the results of experience in operating trackless transportation so far, it must be appreciated that higher operating costs per seat-mile with busses justify a higher rate of fare in proportion, in compensation for any expedited service which may be possible by their operation.

Transportation is lacking in some places where lines have been abandoned on account of high costs of operation or of track reconstruction. The public formerly served by these lines feels that an injustice has been done their communities. Not only where lines have been abandoned, but also in many local and country sections where highway transportation has never existed, there is a growing demand for some service, and this demand is constantly increasing where communities are stretching out into new territory and going through a process of natural growth. As the recognized distributors of transportation, the traction companies should be prepared to supply this lack. It must be realized, however, that it is incumbent upon sparsely settled districts to assist by caring for deficits until the service becomes self-supporting. Never again must the transportation companies and the riding public, who eventually pays the bill, be imposed upon for the purpose of land development exploitation.

Your committee has five members who have served at least two years and whose companies are in the business of operating motor busses. In fact, of the thirteen members, ten represent organizations that have inaugurated motor bus operation.

The members of the committee are convinced that the

Salient Features of Report of Trackless Transportation Committee

THE higher unit cost of bus transportation is justified where traffic is light, but a higher fare should be charged.

The number of electric railway companies operating busses increased from 44 in June, 1922, to 95 in June, 1923, and the number of busses from 300 to 925.

Social and economic forces which have caused the adoption of auxiliary bus service by 95 companies will continue to expand their use and electric railways should be alive to possibilities of bus operation.

The motor bus amalgamates well with street railway transportation.

The automotive industry is now developing passenger carrying vehicles of improved design and they are being adopted by street railways.

Traction officials should not allow antagonism aroused by jitney competition to blind them to the fact that it is their duty to supply transportation.

Electric railways must keep pace with developments in the transportation field if they expect to continue the distribution of transportation.

As the recognized distributors of transportation, traction companies should be ready to supply the needs of new and developing communities.

Mass transportation cannot be handled with busses, and electric railways are essential for this purpose.

motor bus has come to stay. It is a business proposition, not a theory. In fact, the use of busses where feasible is an established policy with most of the members of your committee. Committee reports have been made in many associations of street railway men and in the automotive industry. Technical journals have compiled statistics of every description. Two conclusions seem to be reached by reading these data and these reports and from our own experience.

(1) The electric car, running on rails, is still the most essential, reliable and economical method of urban, suburban and interurban travel, considering the transportation problem as a whole, and especially for mass transportation. This condition arises largely from the fact that the operation costs per passenger are higher for bus operation than with electric cars, and from the further fact that it is not possible to handle mass transportation with busses.

(2) We need the motor bus to feed and supplement our car lines, to open up new territory; in fact, to complete, round out and make whole passenger transportation on the highway.

As stated by this committee in the past, it is our duty, as public servants charged with the responsibility for conducting the highway transportation in our respective communities, to adopt every feasible unit or method for furnishing this service.

Heavier Motor Vehicle Taxes Are Recommended

IT was evident the committee on uniform motor vehicle regulatory laws did not consult with the trackless transportation committee in the preparation of its report, which was somewhat reactionary in character and which took the position that buses should be regulated rigidly and taxed more heavily. After reviewing the legislation of the past year on this subject, the committee said:

"As a rule, the taxes in all States are much lower, probably, than the cost of maintaining the highways damaged by motor vehicle common carriers. Until this situation has been corrected the public will be subsidizing the operation of these new transportation units."

One of its recommendations is for a "compensatory tax" which will produce "such an amount as will repair the damage done to highways by motor vehicle common carriers." It is contended that to obtain complete compensation for the use of highways by motor vehicle common carriers the States should determine "how much damage a ton-mile of travel does in cents and fractions thereof to each type of highway commonly in use." The report follows:

DURING the winter just passed there have been in session forty-five State Legislatures, and legislation affecting the operation of motor vehicles for the transportation of passengers and freight on the public highways has been passed in twenty-two States. This legislation passed in twenty-two States is of varying degrees of importance. Some of the States, such as Iowa and Oklahoma, have passed general, full and complete regulatory laws affecting motor vehicle common carriers. Other States have merely amended certain sections of their present laws. In seventeen States a gasoline tax has been imposed upon all motor vehicles, whether common carriers or not, making a total of thirty-six States now having such a tax.

Ten States have increased their gasoline tax, the amount of the increase varying from 1 cent to 2 cents per gallon. The gasoline tax runs from 1 cent to 3 cents per gallon, the lower figure being the rate of taxation in the States of Arizona, Connecticut, Kentucky, Louisiana, Maine, Mississippi, New Mexico, North Dakota, Texas and Vermont, and the higher figure the rate in Florida, Georgia, Oregon, South Carolina and Virginia. In seven States there was no attempt made to pass legislation affecting motor carriers. In six States legislation was attempted but failed. In nine States we have yet to learn whether or not legislation was passed, as the legislatures are still in session. In the State of Wisconsin a bill has been drawn and reported favorably by the committee, which remains for the action of the legislature.

There remain almost as many plans of taxation of motor vehicles and motor vehicle common carriers as there are State taxing bodies. The complete plan of

taxation per ton-mile of travel over and along public highways, as suggested by this committee in our report at the last annual meeting, was adopted in one State (Iowa) with the exception of the rate of taxation suggested. The rate was changed from 1 cent and 1½ cents to ⅛ cent and ¼ cent respectively. Otherwise the plan was unchanged. In one State (West Virginia) the taxation of motor vehicle common carriers is based on a prescribed sum per passenger seat-mile for passenger carrying vehicles, such prescribed rate being higher for heavier motor vehicle units and lower for lighter motor vehicle units. In this State, freight carrying common carrier motor vehicles are taxed on the basis of a prescribed rate per ton-mile, the rate being less for lighter vehicles and higher for heavier vehicles.

IN general, however, the plans of taxation remain chaotic, unscientific and unremunerative. As a rule, the taxes in all States are much lower probably than the cost of maintaining highways damaged by motor vehicle common carriers. Until this situation has been corrected the public will be subsidizing the operation of these new transportation units.

In all legislation of a general character passed during the last winter the requirement of a certificate of convenience and necessity before a motor vehicle common carrier can operate has been enacted into the laws. It is manifestly conceded by all parties concerned that such requirement is fundamentally sound. Also, in all States passing general motor vehicle legislation within the past year, liability insurance bonds to protect the public against injuries and damages have been required. This insurance feature, therefore, in addition to the certificate of convenience and necessity feature, has apparently been accepted as basicly necessary in any effective motor vehicle regulatory law. There has been some divergence of ideas in the application of these two fundamentals, the insurance required in some States being somewhat less than in others and the character of the insurance being somewhat different. Certificates of convenience and necessity, while required in all new general laws, are issued under very stringent conditions and regulations in some States, and under less close regulation and requirements in other States.

THERE are a few fundamental ideas that should be borne in mind by all of us in the discussion and crystallization of proposed motor vehicle regulatory laws. These basic principles must be secured in any new laws in order that regulation may be effective. First, certificates of convenience and necessity, making it unlawful for any motor vehicle common carrier to operate or commence operation until some State authority has consented to the operation of a common carrier by motor vehicle. Second, sufficient power lodged in some department of the State to supervise and regulate the rates, service, accounts, and safety of operations of every motor vehicle common carrier. Third, adequate insurance to protect passengers and public from injuries and damages caused by the operation of motor carriers. Fourth, a compensatory tax which will produce such an amount as will repair the damage done to highways by motor vehicle common carriers.

Until a better plan has been devised, it is the opinion of this committee that there should be urged upon the public the necessity of taxing motor vehicle common carriers on the basis of the amount of use of the highways. In other words, there should be some relation between the damage done to highways by motor vehicle common carriers and the amount of tax paid by such carriers for the use of the roads. To secure complete compensation for the use of highways by motor vehicle common carriers, every State should be urged to study this question on the basis of reducing their information to the point of how much damage a ton-mile of travel does in cents and fractions thereof to each type of highway commonly in use. When that has been determined by investigation, the rate of taxation per ton-mile of travel can be accurately fixed.

UNTIL it has been determined, the principle involved in the application of the ton-mile tax should be urged and the rate set at a tentative figure that will be certain to be sufficient. This may be done without particular detriment, because such rate may be changed from time to time as the studies advance without it affecting the sound principle of the ton-mile tax. It is vital to all concerned that the present public subsidy in the shape of uncompensated use of roads be withdrawn from motor vehicle common carriers. Every taxpayer is interested in this, and every other form of transportation is also interested in it. When such public subsidy has been withdrawn the rates charged on this new form of transportation must necessarily be fixed at such a point as will compensate their use of highways, and when this is done the present unfair and indiscriminate competition will be substantially curtailed.

It is gratifying to your committee, as it must be to the association, to note that the draft of uniform motor vehicle law as proposed by your committee at the last annual meeting has been more or less used in many States in framing new motor vehicle common carrier legislation. In reading the new general laws that have been passed in various States, it will be found that many parts of such laws have been written quite largely from the tentative draft adopted by this association at its last annual meeting.

Electric Railway Head Favors Motor Bus Use

A SYMPATHETIC attitude toward the use of buses by traction companies also was manifested by C. D. Emmons, president of the association, who is president of the United Railways and Electric Co. of Baltimore. His corporation operates a large number of buses to supplement its rail service and is one of the most progressive in the country in this respect. In his address Emmons said in part:

We meet at a time when the electric railway industry is in better condition than at any moment since the World War upset the equilibrium of the country. Taking the country as a whole, the public now has a better understanding of the mutuality of interest between the electric railways and the people, and this improved understanding has brought about revisions of rates of fare, partial alleviation of burdensome conditions, movements for protection of established and necessary service from incursions by irresponsible competitors, and, in general, has paved the way for further relief from hampering obligations that have reacted against the public good.

Uppermost in the minds of many of you are the problems that have arisen in connection with the increase in the number of automobiles. Some of you have seen your business in sparsely settled districts drop until it no longer paid the expense of operation. For a time it seemed as if you might have to quit, and so you would had the public not found that the electric railway

is the cheapest, most reliable, most responsible transportation agency.

INTERURBAN roads have suffered not only from unfair, parasitic bus competition, but also because of the great increase in the number of privately owned automobiles, and many an urban railway has had to face the same situation. Nevertheless, it has been proved that the place of the electric railway is secure. Wherever a test has been made, the inevitable conclusion was that business could not prosper, that manufacturers could not conveniently carry on their enterprises, that home building could not expand, that public comfort could not be advanced without the electric railway.

There are more than twelve million automobiles registered in the United States. The number is likely to be greater, for the automobile fills a popular desire. However, I feel the saturation point is rapidly being reached, for there are serious problems of congestion in the large cities, the accident hazard steadily grows worse, and the situation but emphasizes the injustice of the paving obligations which many States and communities impose upon electric railways.

As you all know, the paving charge which so many of us have to meet is in fact a subsidy of automobile traffic paid by the car riders. Originating when horses hauled street cars and pounded the pavement between the rails, this charge became illogical and unjust when electricity became the motive power. The modern electric car does no damage to the pavement between the rails or outside of them. The pavement is used entirely by other vehicular traffic, which causes whatever damage is done.

The report of the committee on special taxes will go into detail on this subject, and I want to recommend that you give it careful attention. It shows that almost 10 per cent—9.6 per cent, to be accurate—of the operating revenue of railways reporting to the committee is paid to the Federal, State and local governments in taxes and imposts. The taxes include special taxes for the support of schools, parks, bridges, highways, soldiers' bonuses, and many other purposes; there are license fees of wide variety; many communities demand that the railways carry free of charge their policemen, firemen and other employees. In some places the United States Government does not pay for the transportation of letter carriers, and we all know that it pays but a small part of the cost of carrying the mail. None of us raises objection to fair taxation, but as matters stand today we are unfairly taxed, and imposed upon.

We have no quarrel with the private automobile owner, and we have no quarrel with the bus except when the bus enters territory that is rightfully that of the electric railway. I say "rightfully" because the States and communities, in giving the companies the right to do business in the streets, retain to themselves the power to regulate service and control rates of fare. Having done that, the duty of the public to the railway should be obvious—the public must protect the railways in their rights, else the public itself will be the loser.

THE people have learned that freight trucking over highways is extremely damaging, not only to the highways but to the public purse, and this knowledge has brought about enactment of laws that will, when they have been perfected, put a proper share of the cost of maintaining public highways upon the vehicles that are most destructive to them.

It is also very interesting to note that the automotive industry is showing every desire to cooperate in bringing about coordination of electric railway and motor transportation. There was a time when the automotive industry seemed to think that the vehicles it produces could supplant the electric railways, but experience has shown them what it has shown the public as a whole—that the electric railways have a distinct field in handling mass transportation, that electric street cars afford the cheapest means of transportation of the masses, that such competition as trucks and buses attempt to give is ruinous, and that when buses are operated in public transportation the street railway company in each community is best equipped to operate them. So, today we find the automotive industry declaring with us that buses should be feeders or auxiliaries to electric railway service.

The United States Chamber of Commerce is at work upon a report on transportation, and through a subcommittee the case of the electric railways is being adequately presented. I am sure that the report of the Chamber will present the facts of transportation in this country in such completeness and so clearly that a long step will be taken toward the permanent stability of this all-important factor in human happiness and prosperity.

At our convention a year ago we adopted a report of the committee on trackless transportation in which was the following statement:

"WE believe firmly that all of the transportation requirements of any community should be furnished by one agency and that that agency should be the electric railway company. It alone has the trained organization and ripe experience required for handling passenger transportation problems and the development of any other agency for handling those problems would result in a duplication of service, which could produce only a higher cost of transportation to the public. . . . Hence it is our duty as public servants, charged with the responsibility for conducting highway transportation in our respective communities, to study and consider the availability of every feasible unit or method of furnishing this service."

Since that report was adopted there has been a great increase in the number of electric railway companies operating buses in connection with their rail service. More than one hundred electric railway companies, ranging in size from the largest to the smallest, have invested upwards of $6,000,000 in buses, and hundreds of thousands of dollars in garages and service stations and equipment. Electric railways now are operating more than 1000 buses. Two companies alone have invested more than a million dollars in buses in the last year.

Whether the bus transportation business is profitable at present is open to argument—in some places it is and in others it is not. Where buses can be operated in densely populated districts and where the hauls are short, they can be operated profitably at street car fares, but in general transportation they can serve the public only at a higher fare. Problems connected with proper design of bodies, proper apportionment of weight on axles, proper tires and other equipment, as well as accounting systems that will make it possible to determine the real cost of operating buses, have yet to be worked out.

The important fact, from the standpoint of the public, is that the electric railways are giving the people the kind of service they demand, and are giving it on regular schedules, regardless of weather, and at the lowest possible rates of fare. That they will continue this policy is assured. The public in most communities has come to understand that the street railway companies are making every effort to provide adequate service, and that they cannot do this unless a fair deal is accorded them by the people.

Service Is First Demand in Transport, Says Reeves

POINTING out that low cost is not the only factor to be considered in transportation, Alfred Reeves, general manager of the N. A. C. C., said that the average American is ever ready to pay extra to save time and secure comforts. Part of Reeves' speech was as follows:

Few will deny that the trolley supplies the best form for mass transportation.

It is generally agreed that transportation in big cities can best be served by a monopoly, provided that monopoly is not abused, not over-capitalized, and is properly regulated by State authorities.

Unfortunately, monopoly in transportation in the past has been abused, and the public has resented it.

The newspapers gained circulation and politicians gained popularity by shouting about it.

Our industry appreciates the hardships of the electric lines. There has been legislation far beyond what seemed necessary. There has been taxation almost to the confiscation point. There have been rulings that were almost impossible to obey.

During the past five years, you have also been faced with a new form of transportation, which has in many cases added to your income by increasing the number of passengers traveling; but at other times has undoubtedly cut into your earnings to a substantial degree.

But who is at fault?

We surely cannot blame the public for patronizing the most efficient means of transportation.

LOW cost has not always been the answer, because the average American is ever ready to pay extra to save time and secure comforts.

This is shown by the ten-cent fare paid by 55,000,000 people last year who patronized the Fifth Avenue bus service in New York. Here is a company which caters to its patrons, and its riders would rise against any administration that attempted to treat it unfairly!

The public, I am sure, will gladly pay eight or ten cents for a special bus service even where the trolley fare is five cents, and it should be willing to pay extra where buses and trolleys are on a transfer basis.

The private passenger car operated by its owner on the roads which he builds and pays to maintain is with us now to the number of almost 11,500,000, with 3,500,000 more going into service as the production for this year, part as new units, part to replace old rolling stock.

The motor bus came to supply a needed service—the wildcat motor bus and bus operator in the beginning, if you please, and yet haven't all big movements started in just that way?

Trolley equipment was not like it is today.

You all remember some of the early motor cars. We were young and made mistakes and we shall continue to make mistakes.

Buses increased in numbers because they furnished a service. Some trolley leaders saw the development and put them on as feeders to their lines, while others declared opposition.

There are probably 40,000 buses operating in America.

More than 100 trolley companies are now using not less than 1000 buses.

In addition, there are 90,000 taxicabs.

America is trained to ride on rubber tires.

Two questions present themselves:

If the buses had come first, how many of them could now be supplanted by trolley cars?

Does rubber endanger the rails?

The bus business is an infant compared with your great industry. It cries for adoption and care.

If it is mistreated and punished, its users and proponents will appeal to public opinion, the greatest of all laws, and the conflict certain to result will be harmful to all.

The bus is a member of the transportation family, born of an emergency and certain to grow into a lusty youngster.

It should be adopted as an ally of the trolley, which we shall always have, because the electric lines are still the best forms for mass transportation.

With the present congestion of traffic and concentration of population, the trolleys cannot properly handle all street transportation.

They cannot afford to build in sparsely settled territories.

They cannot supply the flexible movement of transportation offered by the trackless and less noisy motor vehicle which loads and unloads at the curb, while permitting other traffic to pass.

NOR can the bus do it alone. Think how many would be required to supplant the trolleys, which last year carried 15,000,000,000 passengers, which was 15,000,000 more than in 1921.

A combination of trolley and bus seems to be the real answer.

Many successful bus operations will continue independently because they are supplying a service. But many poor operations can be made a success by transportation experts from the trolley field.

We must give credit to the pioneers in the bus field for the missionary work they have done.

In some instances it seems best for bus lines to be run independently, but in a broad sense it has appeared to us in the bus industry that, as experts, the trolley people had a rare opportunity to enter the bus field and thus give the public complete transportation.

It is doubtful if the public will support bus lines conducted on a trolley basis. While not always possible to realize, the aim should be to give a bus seat to every passenger.

This has been done successfully in New York, Detroit and Chicago, and we feel it can be done in other cities.

Whether trolley companies should own and operate motor buses has been a much discussed question and comes up in concrete form in this State, where all trolley service was suspended for seven weeks and the public depended for its transportation almost entirely on motor buses.

There are three parties in interest in this transportation problem—the public, the trolley companies and the bus companies.

Time is a big element and no one has more than 24 hours in the day, whether his name is Rockefeller or Reeves.

Progress depends entirely on how much one can do in those 24 hours.

WE are in a great field, because, the alphabet and the printing press excepted, no invention has been so beneficial to mankind as that which shortened distance.

The public wants quick, safe, comfortable and economic transportation and cares not about the medium.

Given the service, it will gladly pay a proper fare.

The trolley company's interest in transportation lies in protecting its capital investment, securing new capital, caring for depreciation, returning proper dividends on securities, covering its general expenses, paying taxes and

in meeting charges for paving between the tracks.

The bus operator's requirements are about the same except as to the paving charges, but these are offset by registration fees, fuel, taxes and special impositions of one kind or another.

What is the answer?

IT can be left to an unaided solution on the basis of economies, which, after equalization of responsibility and opportunity, and with unlimited and uncontrolled competition, would mean a survival of the fittest.

Under such a plan, all would suffer, the public included, by the great destruction of capital involved.

On the other hand, one can hasten a solution and avoid wasteful competition by recognizing that in certain fields of street transportation the trolley is supreme in efficiency and economy. In others the bus holds a similar position. This demands that the two forms be coordinated.

The prime consideration, therefore, is to fix the fields of endeavor which each shall enjoy.

The necessity for coordination brings us to the question of whether the trolley shall own and operate buses, or whether a bus operator shall be under a control independent of trolley management.

Legal and equitable considerations would, of course, enter into this question.

The public may be counted upon to support that type of management which gives the best service. In the past people have opposed trolleys managing bus lines because they feared the trolley service with its straps, and sometimes an apparent lack of consideration for patrons.

We believe that the power of the trolleys to acquire, own and operate buses should be exercised largely in new fields.

It hardly seems equitable, except where there has been illegal or unjust competition, that they should be allowed to destroy bus transportation in the hands of others.

In all cases where men have taken the risk, and borne the heat and burden of the day, in order to build up a bus transportation business, equity demands that they be permitted to retain that business if it is not adverse to public welfare, or be paid for the business a sum which is not measured by the sum of the second-hand value of the equipment, but the value of a going concern which pioneered a development that has proved of benefit to the public.

WE feel our industry is in accord with yours, so far as it relates to State supervision of common carriers. More than two years ago we declared in printed form that control over motor vehicle common carriers, if deemed necessary, should be placed in existing State commissions and that as a prerequisite to operation the owner should be obliged to obtain a certificate of public convenience with the proviso that lines in actual operation shall prima facie be regarded as necessary.

Our declaration called for liability insurance, with special or extra fees utilized for highway maintenance, and advocating legislation to enable steam railroads and trolleys to own and operate the motor vehicle in conjunction with their regular line of business.

Automobile Promotes Civilization

PAINTING a graphic picture of the gigantic stature attained by the automotive industry, with the American people spending annually for motor vehicles and their maintenance a sum in excess of the total tax burden of the country which amounts to $8,500,000,000 a year, the Manufacturers Record of Baltimore pays tribute to the influence of the automobile in promoting civilization.

"This country," it says, "has entered upon an entirely new era in the utilization of the automobile. The internal combustion engine has revolutionized everything in America. It is a greater advance in many respects over conditions which previously prevailed than was the development of railroad transportation in contrast with the old stage coach methods of travel and of doing business. It would be folly to try to forecast the future.

"It is enough to make us wonder what is ahead of us when we realize that in a little more than a decade this industry has been so expanded that the amount annually expended for the purchase of cars and tires and other materials, and for the maintenance of these cars, exceeds the total taxation of the whole country, and is equal to one-half of the total investment in all the railroads in the United States.

"The question which the political economists may very properly ask—and this can be answered from the viewpoint of the optimist or the pessimist as one may be so inclined—is this: Are we going too rapidly in the utilization of the automobile in proportion to the increase in national wealth, or is the automobile increasing our national wealth by increasing man's ability to produce to such an extent that from every standpoint the country is justified in the development of this unprecedentedly great industry.

"In the Book of Books we read:

" 'The chariots shall be with flaming torches.

" 'The chariots shall rage in the streets, they shall jostle one against another in the broad ways; they shall seem like torches, they shall run like the lightnings.' "

Mechanical Refinements Are Numerous at Paris Show

European countries well represented at French exhibit. Relatively few new chassis are being shown. Business prospects very bright.

By W. F. Bradley

Paris, Oct. 7. (*By Cable.*)

A WEALTH of mechanical refinements in chassis and bodies, prospects for excellent business in 1924, and a general price increase of 5 to 10 per cent, were revealed at the opening of the Paris passenger car show which began Thursday, Oct. 4, and which will continue until Oct. 14.

There are 848 exhibitors, among which are representatives of France, Belgium, Italy and other European nations. The United States is represented by General Motors, Studebaker and Lincoln, while Rolls-Royce and Austin are the only English cars being exhibited. An unusually large number of American engineers are attending the show.

Less than a dozen entirely new chassis are being exhibited, but mechanical refinements of importance have been made on nearly every car shown.

Voisin is exhibiting the Lavaud automatic transmission by which the gearing is changed automatically in accordance with the resistance encountered by the road wheels.

Delage has added a high grade six-cylinder car with an overhead camshaft and hydraulically operated servo brakes.

Chenard-Walcker exhibits a new four with 122 cu. in. and a new eight with 244 cu. in. piston displacement.

Features of these cars are overhead valves, dry sump lubrication and brakes on the front wheels and the transmission but none on the rear wheels, these brakes being operated by a servo device. The Sizaire Brothers have produced an original chassis without axles in the ordinary sense of the word, and with what they call "independent suspension" of all four wheels.

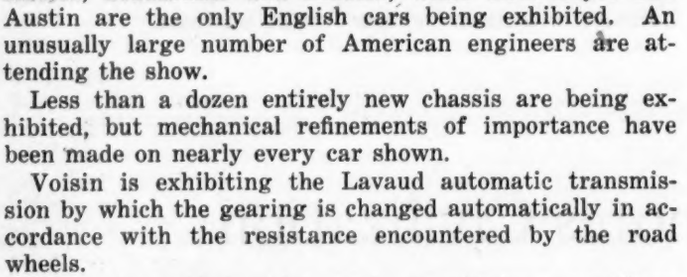
Renault is now mounting the gearbox at the forward end of the torque tube on all of his models. Berliet is marketing a new car with an overhead valve engine, four-wheel brakes and a 110-in. wheelbase at a low price. Charley, who formerly represented the Mercedes car in France, has come out with an attractive high grade small six-cylinder car under his own name.

Twenty-nine Makers Adopt Balloon Tires

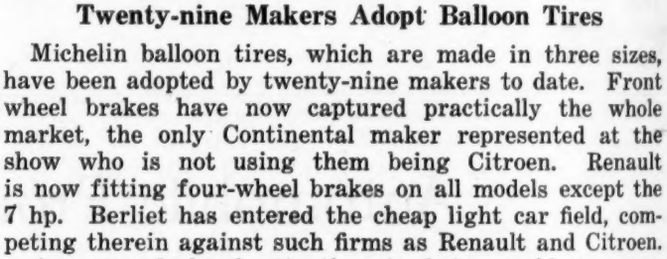
Michelin balloon tires, which are made in three sizes, have been adopted by twenty-nine makers to date. Front wheel brakes have now captured practically the whole market, the only Continental maker represented at the show who is not using them being Citroen. Renault is now fitting four-wheel brakes on all models except the 7 hp. Berliet has entered the cheap light car field, competing therein against such firms as Renault and Citroen.

A great deal of attention is being paid to servo mechanisms for brakes by the makers of high grade cars. The valve-in-head engine is gaining ground rapidly, all of the new engines brought out being of that type. Pushrod operation of overhead valves is more popular than the overhead camshaft type of construction, however.

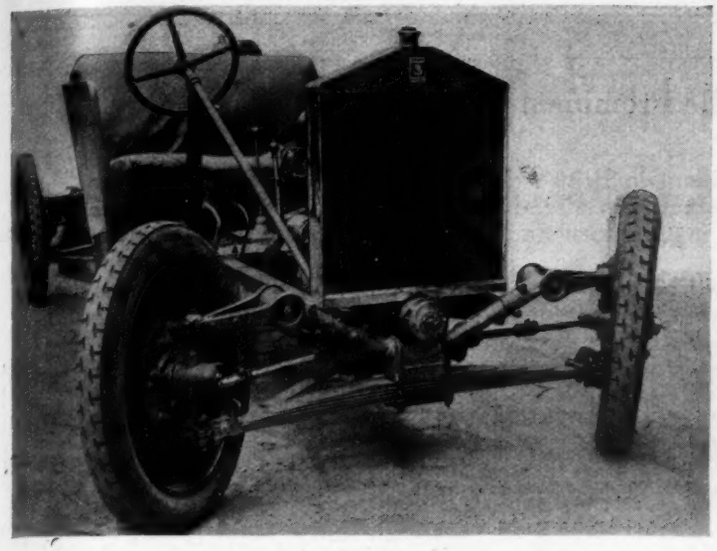
Closed bodies are getting to be more popular, and the Weymann light-weight, fabric-leather type of body has



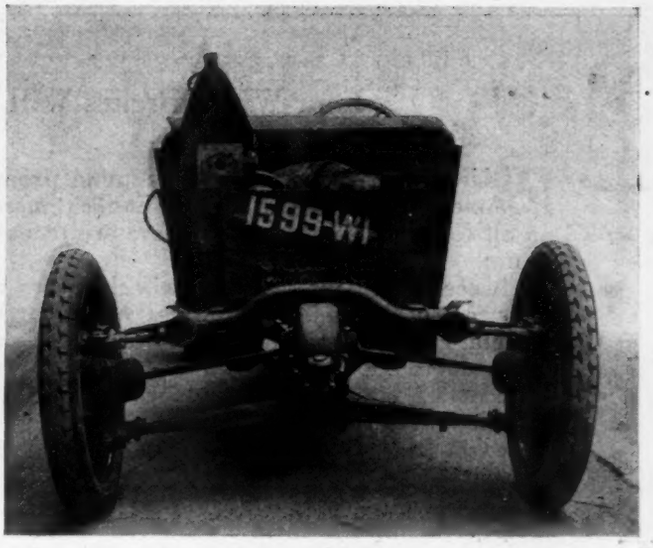
New Delage model has overhead valve engine instead of L-head type used in previous years



Novel valve gear used on new French car of radical design



Front view of new car brought out by brothers Maurice and Georges Sizaire



Rear view, showing transverse spring and absence of axle housing

been adopted by several custom body builders. Much interest is being shown in the Shilde convertible bodies applicable to quality production jobs.

The French industry expects 1924 to be the biggest year in its history. Home demand is strong and exports have been growing steadily for some time past. The increased prices which have just taken effect are not likely to have any marked effect in slowing up sales, since the public has been well prepared for them by a strenuous newspaper campaign.

Delage Has New Model

The Delage program for 1924 marks a break-away from the L-head engine in favor of the overhead valve type. The nominal 12 hp. model, produced two years ago, is now replaced by a new 2.95 by 4.73-in. engine with a detachable head having vertical valves operated by pushrods and rockers. The three-bearing shaft has given way to a five-bearing shaft of 2.16-in. diameter, with circular webs, and instead of pump lubrication with constant level troughs, the oil supply is now under pressure to the main bearings, the rods, the drilled overhead rocker arm shaft, and through the rockers to both the pushrod heads and the valve stems. Oil is also injected under pressure to the inner face of the two chains at the front end of the engine. The new engine has I-section rods, long aluminum pistons with hollow piston pins of .98-in. diameter, and has five narrow compression rings fitted to the piston. By reason of these features it has been possible to run the engine speed up to 3000.

The new engine has a triple venturi Zenith carbureter bolted up to the left-hand side, but drawing in its air from the base chamber by means of an aluminum bypass on the right-hand side of the engine, and a passageway through the cylinder block. Chassis features remain unaltered except for details. Delage having been the first in France to adopt front wheel brakes, these are naturally continued and are of the same general design for all models. Cables are used throughout, with only four points of adjustment, by means of wing nuts—two of these being at the front and two at the rear.

In addition to the normal model, Delage is now marketing this 12 hp. chassis as a Colonial type with a 56-in. tread, clearance of 11.8 in., 880 by 120 mm. tires, and final gear ratio of 4.5.

The six-cylinder L-head engine has been discarded in favor of the overhead valve model with pushrods, detachable head and overhead rockers. In addition to this type, a very high grade six-cylinder with overhead camshaft, dry sump lubrication, thermostat for both water and oil circulation, and four-wheel brakes with servo-mechanism, is about to be placed on the market. This is a bid for the quality market with price as a secondary consideration.

The brothers Maurice and Georges Sizaire have just put on the market a new 122 cu. in. passenger car embodying numerous original features. Among the advantages claimed is that the chassis of 130-in. wheelbase, 49-in. tread and 765 by 105 tires, weighs only 1366 lb., all accessories included.

Reduced unsprung weight, a light and rigid chassis construction, a new type of internal band four-wheel brake, rack and pinion steering, and valve springs which can be dismounted without the use of tools and without interfering with the valves, are the outstanding features of the new production.

Transverse leaf springs 3 in. wide are used front and rear. The front spring is clipped to a very open V assembled frame cross member, to the outer ends of which two levers are secured by a central bolt and spherical bearings with asbestos fabric linings. The outer ends of these two double levers have ball and socket connection to the head of the steering pivot, the bottom of the steering pivots having similar connection to a forging clipped to three leaves of the transverse spring. From each extremity of the transverse spring there is a single leaf spring of 3 in. width anchored to the engine base-chamber.

Novel Rear Suspension

The rear system of suspension is similar to that at the front. The aluminum differential housing is clipped to the tail of the central chassis tube, the same clips also anchoring the transverse spring, and the differential housing also being bolted to a rear tubular cross frame member. Transverse cardan shafts are used for transmitting the drive from the differential housing to the rear wheels. A three-speed gearbox is mounted centrally in the chassis, with drive to the bevel gear by open propeller shaft parallel with the central tube.

Steering is by rack and pinion, with the teeth cut helically and mounted in an aluminum housing behind the frame forward cross member. The rack, which is

Four-Wheel Brakes Will Be Prominent at British Show

FOUR-WHEEL brakes are becoming prominent in British design this year, as well as in new American models. Eleven English manufacturers already are offering chassis with brakes on all four wheels. Most of these are recent installations and others are expected in the near future.

It seems evident that four-wheel brakes will be a feature of the Olympia Show, which begins this year on November 2. Many prominent American engineers have gone abroad to attend this exhibit, indicating an unusual interest in British design developments at this time.

A complete record of new British features exhibited at Olympia will be given to readers of Automotive Industries in the issues of November 8 and November 22. The first of these will be a cable story, which will tell the outstanding features of the show, together with a summary of trends in British practice. The later issue will carry a mail story, giving complete technical details of all the new developments.

Both of these articles will be written by M. W. Bourdon, Automotive Industries' British correspondent, whose interpretative technical stories have won such high praise from American engineers during the past decade.

of circular section, is carried between V-shaped rollers, with coil springs behind the roller guides to maintain a constant pressure between rack and pinion.

The feature of the four-wheel brakes is the use of internal bands, these being of flexible aluminum with the lining riveted to the shoes and not to the bands. Cables are used exclusively for brake operation, with the pulleys, wherever employed, mounted in dust and oil proof aluminum housings. A continuous cable operates the entire braking system, the point of anchorage of this cable constituting the only point of adjustment. This point is at the side of the gearbox, with the control lever passing through the floor boards, and permits brake adjustment while the car is running. Foot operation of the four brakes is provided for and, in addition, the lever mounted on top of the gear box enables the front wheel brakes to be applied when pushed ahead, and the rear wheel set on pulling to the rear.

Valve Mounting Is Feature

There is rather less departure from standard practice in the engine than in the chassis. The four 3 by 4.33-in. cylinders are an iron casting with detachable head and having two valves per cylinder of 1.42-in. diameter slightly inclined in the head. The feature here is the method of mounting the three springs per valve. A tappet with a big diameter head is screwed on the valve stem, the under face of this tappet having teeth cut on its circumference, which engage with a steel stamping saddle-piece, each extremity of which receives a coil spring, as shown in the illustration. There is a 9-lb. spring on the valve stem, while the two main springs are 17.5 lb. each. This design allows both springs to be taken out without interfering with the valve, and without there being any danger of this latter dropping into the cylinder. Adjustment of clearance between cam and valve is effected by compressing the valve springs by means of the saddle-piece and screwing the tappet in or out. The saddle-piece locks the tappet in any position. A roller chain is made use of for driving the overhead camshaft. The camshaft pinion is of duralumin.

A two-bearing crankshaft of 1.97-in. diameter is used. The rods are of I-section and the pistons of a magnesium alloy. The latter are 3.94 in. long and carry five narrow compression rings. Lubrication is under pressure, with nearly 3 gal. of oil in the basechamber. The plunger type oil pump is carried on the cap of the rear main bearing and has an aluminum pinion engaging directly with a spur pinion on the crankshaft. With all its accessories the engine weighs 318 lb.

Standard Motor Truck Line

ADDITION of a 2500-lb. speed truck has completed the line of the Standard Motor Truck Co. The new model is equipped with standard units which are made by the same manufacturers that provide the equipment of the four larger models. The major units include a Continental engine, Brown-Lipe multiple disc clutch and three-speed gear box with Timken axles, the rear axle being of the semi-floating worm gear type. The wheelbase of the speed truck is 134 in. Steel disc wheels carrying 33 x 5 in. pneumatic cord tires are standard equipment. The chassis price is $1,330.

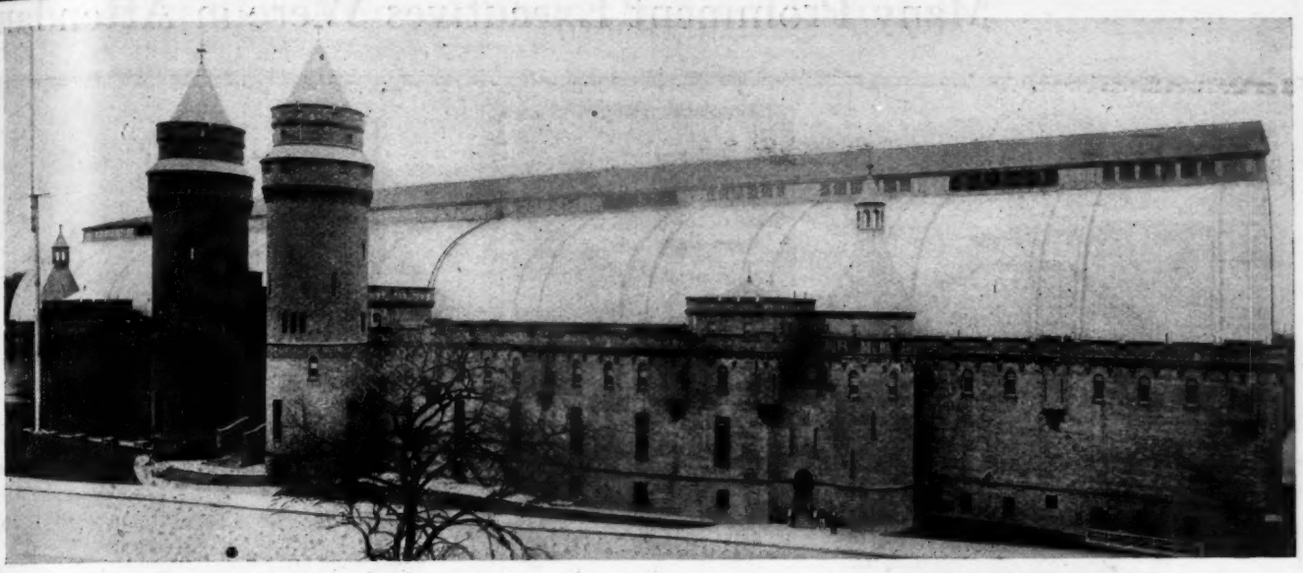
The entire line, which has been highly standardized, now includes the following:

Model 75 speed truck	Maximum capacity 2,500 lb.	price $1,330
Model 1½ K	Maximum capacity 3,000 lb.	price $1,695
Model 2½ K	Maximum capacity 7,000 lb.	price $2,795
Model 3½ K	Maximum capacity 10,000 lb.	price $3,645
Model 5 K	Maximum capacity 14,000 lb.	price $4,495

Pressed steel frames are now standard in all models. Each model with the exception of the speed trick is built in two or more wheelbase lengths for the standard, special long and tractor types of service. This company specializes in the production of special bodies.

A FORMER director of the Shanghai storage battery plant of the Ministry of Communications, which has been turning out storage and dry batteries for the use of telegraph offices, telephone offices and warships operating wireless, has invented an electric automobile, Trade Commissioner Lansing W. Hoyt reports to the Department of Commerce.

Its small size, simple machinery, trouble-proof operation, small running cost ($2 or $3 per month for electricity) and three-year guarantee make it, says Mr. Hoyt, peculiarly adapted to the requirements of Chinese users. Two-seaters and three-seaters have been made and will be sold at about $300 and $363, respectively (conversions made at June 15 value of Haikwan tael $0.7259).



Site of the 1924 New York Show. 258th Field Artillery Armory, where drawing for show space was held last week

Show Space Drawing Attracts Large Number of Chief Executives

EACH exhibitor at the New York Show in January will have 25 per cent more space than last year in which to display his products. The increased area for each booth is due partly to the dropping out of several exhibitors and partly to the fact that greater space is available in the 258th Field Artillery Armory, site of the 1924 show, than in Grand Central Palace, where all previous shows have been held since Madison Square Garden days.

Members of the National Automobile Chamber of Commerce discovered this fact last Thursday at the drawing for show space held in connection with the annual members' meeting. Attendance at this gathering was excellent, an unusually large number of chief executives being present. Many of them were attracted, doubtless, by the opportunity to examine personally the big Bronx drill hall, which is to be the scene of the New York Show next January. The drawing was held at the Armory instead of at the N. A. C. C. headquarters as in the past.

The members' meeting was held at the Madison Avenue offices as usual, but, following the customary luncheon, the members were hurried into waiting cars and whirled north to the Armory in thirty to forty minutes.

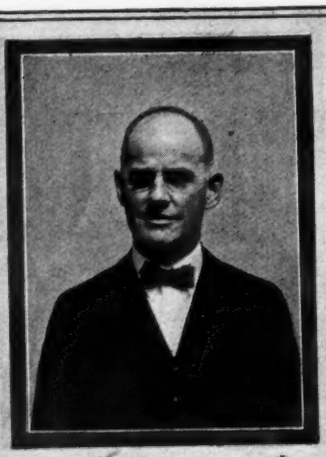
Sam Miles, veteran show manager, took charge as soon as every one had arrived at the show site and in two hours every applicant for space had been cared for. Seventy car and taxicab manufacturers applied for space in the New York and Chicago shows, ten less than the number having displays last year.

The roll call brought responses from the following: Anderson, Apperson, Auburn, Buick, Case, Chalmers, Chandler, Chevrolet, Cole, Collins, Columbia, Davis, Dodge, Dort, du Pont (New York only), Durant, Elcar, Essex, Flint, Franklin, Gardner, Gray, H. C.S., Haynes, Hudson, Hupmobile, Jewett, Jordan, Kissel, La Fayette, Lexington, Liberty, Lincoln, McFarlan, Marmon, Maxwell, Monroe, Moon, Nash, National, Oakland, Olds, Overland, Packard, Paige, Peerless, Pierce-Arrow, Pilot (Chicago only), Premier, Princeton, R&V, Reo, Rickenbacker, Roamer, Star, Stearns, Stephens, Studebaker, Stutz, Templar, Velie, Westcott, Wills Sainte Claire and Willys-Knight.

Cars exhibited in the last show which are not booked for the next one are: American,

Many Prominent Executives Were in Attendance

C. W. Nash



Alvan Macauley

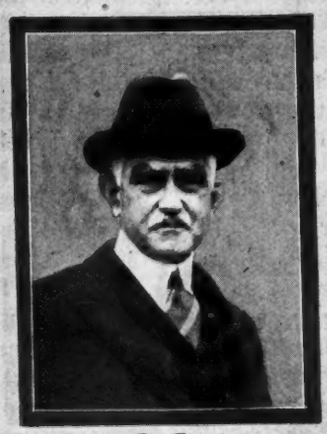
W. T. White

R. D. Chapin

Col. Chas. Clifton

C. D. Hastings

H. H. Rice



J. D. Dort

H. M. Jewett

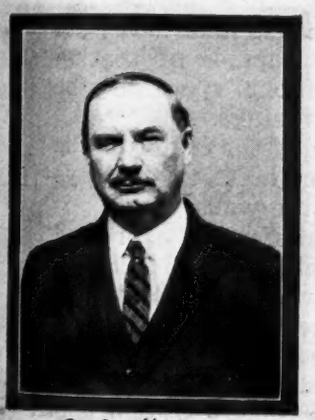
(Photographs by N. Lazernick)

This Year at the Annual Show Space Drawing

J. I. Farley

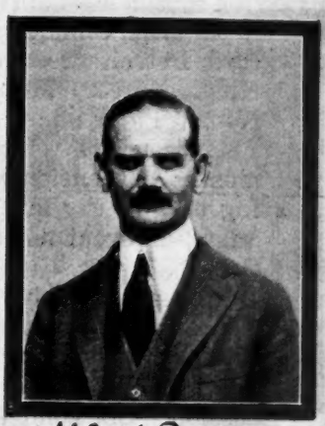
F. E. Moskovics

M. E. Forbes



C. C. Hanch

S. A. Miles



Alfred Reeves

T. M. Graham

W. E. Metzger

A. S. More

(Photographs by N. Lazernick)

Interior of big Bronx drill hall, site of 1924 New York Show. Passenger car exhibits will occupy the center of the floor, while parts and accessories booths will be placed along the walls

Rotary Six, Climber, Hatfield, Courier, Crawford, Detroit Electric, Earl, Elgin, Handley, King, Mercer, Milburn Electric, Mitchell, Noma, Paterson, Sayers, Stanley, Winton. The absence of Winton is due to an eighteen months' suspension which followed the showing of that car last year in the Importers' Salon, an event not sanctioned by the N. A. C. C.

Taxicabs will be displayed for the first time, exhibitions of this type of vehicle at the passenger car show having been approved last spring after considerable discussion. Six companies have taken advantage of the new ruling. These are: Premier, R & L, Reo, Roamer, Willys-Knight and Yellow.

Manufacturers at the drawing made many favorable comments on the Armory as a place for the show after having examined its possibilities carefully. The action of the Show Committee in abandoning the Grand Central Palace for the Bronx site was heartily commended. The members feel that the new hall offers every facility for properly displaying automotive products, while the vast expanse of floor space, unobstructed by pillars, will make possible more impressive decorative effects than ever before.

The exhibitors haven't the slightest complaint to make about the Armory itself. The structure is admirably adapted to show purposes in every way. It is said to have the largest single floor of any building in the world, an area measuring 300 ft. by 600 ft. In addition to the enormous main floor, the Armory has a gallery capable of seating 5000 people. This additional space may be used to considerable advantage.

Car exhibits will occupy the center of the drill hall, while parts and accessory displays will be ranged around the walls.

Coupled with the satisfaction expressed concerning the physical characteristics of the building, however, were some doubts as to whether or not the location is suitable for attracting large crowds.

Subways and elevated will provide rapid transit from the Times Square section and will bring spectators to the door of the Armory. Taxicabs and private cars will supplement rail facilities, while there is some talk of special bus service as an added auxiliary. This combination of transportation media is expected to overcome the obstacle of distance, and there are many indications that it will be successful. Only actual experience, however, can determine this issue.

Dealers and distributors are certain to attend in large numbers, in any case, and the show should be unusually successful from a trade standpoint. Added display facilities and lack of next-door diversions should combine to concentrate the attention of trade representatives on sales and engineering affairs. The isolated position of the exhibition should be a decided advantage in focusing show activities at a single point and thus facilitating the transaction of trade business.

Research Reveals Laws of Friction in Lubricated Bearings

Part II

Shows effects of surface velocity, temperature, character of material and of lubricant on frictional loss. Coefficient decreases in same proportion as load increases. Experiments made by Thurston, Tower, Lasche and others yield valuable data.

By P. M. Heldt

THE engineer, in the course of his education, usually learns first of the laws of friction between dry or unlubricated solids, as established by Morin and others, and he is inclined to form the view that the friction between solids when lubricated, while greatly less, still follows essentially the same laws. This is far from being the case, however. The laws of "lubricated friction" (if this term may be permitted) have been investigated repeatedly, still the variety of the conditions under which bearings work and the variety of lubricants available are so great that research work in this line is still being continued.

The first extensive series of tests on the friction of lubricated bearings was carried out at Cornell University by Prof. Robert Thurston and the results published in a book entitled Friction and Lost Work, published in 1873. In 1883 the Institution of Mechanical Engineers of Great Britain had a series of researches carried out by Beauchamp Tower, and three years later Osborne Reynolds published in the proceedings of the Royal Society of London a remarkable theoretical work in which he applied the known principles of hydrodynamics to the problem of bearing lubrication and thus sought to explain in a theoretical way the results obtained by Tower. Early in the present century two extensive series of experiments on the friction of bearings were carried out in Germany, one by Professor Stribeck for the D. W. F. concern, which developed the annular type of ball bearing, the other by Otto Lasche, engineer of the German General Electric Co. The latter concern at that time was developing an experimental high speed electric railway between Berlin and Zossen, on which speeds of over 100 m.p.h. were attained, and was also engaged in the development of turbo-generators of what were then considered large sizes. In both of these lines of work much difficulty with bearings was experienced, and in order to solve the problems met with a line of research work was undertaken. Before these experiments were started upon the work which had been done along this line by Thurston, Tower and Woodbury was reviewed, but it was found that the ranges of peripheral speed covered in these tests were far below what was required in the work in hand by the General Electric Co. A report on these tests by Lasche appeared in the *Zeitschrift des Vereines Deutscher Ingenieure* of Dec. 13, 20 and 27, 1902, and includes numerous diagrams in which the friction coefficient or the total friction is plotted against specific load and peripheral velocity, specific load and temperature or peripheral velocity and temperature, one factor being kept constant in each series. Practically all of these diagrams are of the three-dimensional type. The research covered a range in specific loads of from 14-2130 lb. p. sq. in., a range in circumferential velocities up to 65 ft. p. s. and a temperature range of from 78-212 deg. Fahr.

The frictional qualities of a bearing can be expressed in three different ways. There is, first, the frictional resistance, which is expressed as a force tangential to the periphery of the journal. This force divided by the total load on the journal is the friction coefficient, which is usually denoted by the Greek letter μ. The frictional work or friction loss is found by multiplying the friction force by the circumferential velocity of the journal, and is expressed in foot-pounds per minute. The friction coefficient, of course, is a mere ratio, while the frictional resistance or force is expressed in pounds.

Laws of Variation Sought

The various series of tests to which reference has been made aimed particularly at determining the laws of variation of the friction coefficient with the specific load, the peripheral speed and the temperature of the bearing, but the effects of the material of the journal and the bearing, of the lubricant and of the bearing clearances were also investigated.

The quality of the lubricant upon which the friction of a bearing depends the most is its viscosity. A thick fluid, sluggish in its flow, has a high viscosity, while a thin, mobile liquid has a low viscosity. From a mechanical point of view it is convenient to regard viscosity as the resistance which a liquid offers to shearing stresses. Consider a viscous liquid separating two metallic surfaces a short distance apart and that one of these surfaces moves relative to the other at a velocity v. If the distance between the surfaces is denoted by a, then the rate of distortion of the liquid is v/a. If one of the two metallic surfaces is stationary and the other in motion, the molecules of the liquid close to the latter surface will move with it at the same speed, while those in successive layers of the liquid will move at less and less speed, the final layer close to the stationary surface being also stationary. The viscosity or coefficient of viscosity μ is then defined by the equation

$$\mu = \frac{fa}{v},$$

where f is the shearing stress in a plane parallel to the motion. The unit of viscosity used in scientific work is the force required to move a stratum of the liquid of 1 square centimeter over another stratum of the same area

a distance of 1 centimeter at a velocity of 1 centimeter per second, and is expressed in dynes (the unit of force in the c.g.s. system of units) per square centimeter.

Tower's experiments were made with a journal 4 in. in diameter by 6 in. in length, on which rested a bearing or "brass" which extended not quite half-way around the journal, the cord of the arc of contact measuring 3.9 in. From the bearing depended a yoke on which the load was supported through the intermediary of knife edges. The advantage of this arrangement is that the angular deflection of the bearing, which could be measured by means of an arm secured to it moving over a graduated scale, measured the total friction at the bearing under any conditions of operation. Alternately, the moment of the friction could be measured directly by placing scale weights on the end of the laterally extending arm until the deflection was reduced to zero, so that the moment thus created balanced the moment due to the friction at bearing.

One of the first things found by Tower upon starting his experiments was that with the ordinary forms of lubrication, such as feeding oil by means of a drip feed, it was entirely impossible to secure consistent results, indicating that the supply of lubricant to the bearing surface was irregular. All subsequent experiments, therefore, were made with oil-bath lubrication. An oil well was formed underneath the journal and filled with oil to such a level that the lower part of the journal was submerged in it. It was Tower who first observed that a journal bearing acts as a pump and not only will raise the lubricant from the well below to the top part of the bearing but will put it under pressure greater than the average unit pressure due to the load on the bearing.

Accidental Discovery Made

The discovery of this fact was made accidentally. A hole having been drilled through the center of the bearing in order to supplement the oil bath lubrication by a top feed, it was found that the oil rose in the drill hole when the testing machine was in operation, and overflowed. A Bourdon pressure gage was screwed into the hole and the pressure on the oil was shown to be greater than the range of the scale, viz., 200 lb. p. sq. in. Later Tower, by drilling holes through the brass at different points and inserting a Bourdon pressure gage of appropriate range of scale, charted the pressure distribution over the whole of the bearing surface.

The total load on the bearing amounted to 8008 lb., so that the average unit load based on the projected area of the bearing was 341.5 lb. p. sq. in. It was found that the highest unit load was not at the center of the bearing but displaced from the center toward the side where any point on the journal enters underneath the bearing. This point of maximum unit pressure, of course, corresponds to the point of closest approach between the journal and the bearing. All around the edge of the bearing the pressure is zero. Along the length of the bearing the pressure is highest in the middle and drops off symmetrically toward both ends.

The distribution of pressure over the projected bearing surface is shown in the three-dimensional coordinate diagram, Fig. 1. At the exact center of the bearing the pressure registered was 625 lb. p. sq. in. and the maximum pressure was slightly higher than this.

After it was thus established experimentally that an ordinary journal bearing acts as a pump the explanation of this action was not hard to find. If a part of a shaft at which there is no bearing rotates at moderate speed in a bath of comparatively viscous oil, quite a thick layer of the oil will adhere to the shaft, owing to the adhesive force between the oil and the steel and the cohesion between the oil molecules. If, now, a half-bearing supporting a load is placed on this part of the shaft, oil will be squeezed out from under the bearing and the thickness of the film of lubricant reduced until the total pressure of the oil on the bearing is equal to the load on same. If, on the other hand, the loaded bearing rested on the journal before the latter was started rotating, at which time there is no oil film, or practically none, on the journal, then, as the journal begins to rotate it will carry along oil into the bearing and build up the film until equilibrium between the oil pressure and the load is established.

Bearing Load Direction Constant

The above applies directly to bearings in which the direction of the load is constant, such as car axle bearings, the bearings of electric generators, etc. The most important friction bearings in an automobile are the main bearings of the engine crankshaft, and the load on these bearings rotates with the crank. In this case, of course, the shaft rests on the bearing, instead of the bearing on the shaft and owing to the load on it, occupies an eccentric position within the bearing. The line of closest approach between journal and bearing therefore rotates. Supposing the oil inlet to the bearing to be at the bottom, this inlet is closed off for an instant when the line of closest approach is opposite the inlet, and half a revolution later there is an eccentric space opposite the inlet. Owing to the pressure on the bearing there is a constant loss of oil at the ends, and this loss is made good by oil flowing into the eccentric space through the inlet. Such a bearing is said to have a breathing action.

One fact that seems at first sight to discredit the film theory is that in all bearings, no matter how well lubricated, some abrasion of the metal takes place, and the bearing wears out in the course of time. It is very likely, however, that this abrasion occurs only during the first

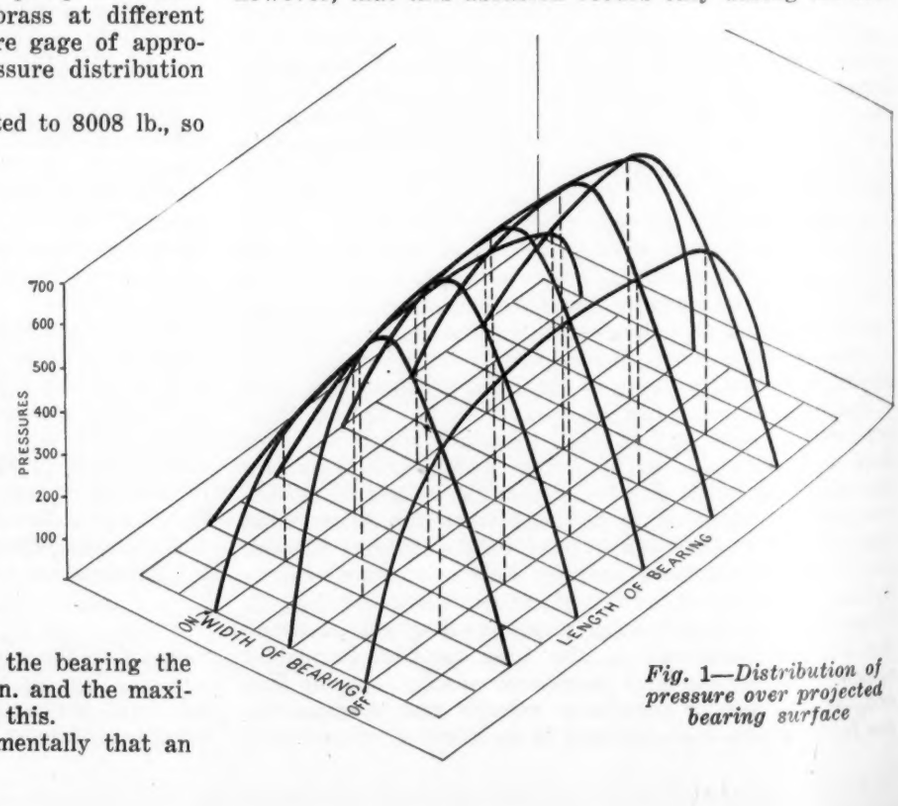


Fig. 1—Distribution of pressure over projected bearing surface

revolution or so when the machine is started from rest. During a protracted period of rest the oil will be forced out from between the bearing surface by the load on the bearing and the protuberances on one surface will engage into the depressions on the other, so that when the journal starts to rotate some of the protruding metal particles are apt to be torn away.

That the point of closest approach, and hence the point of maximum pressure in the oil film should be offset from the load line in the direction toward which any point on the journal moves can easily be shown.

Referring to the sketch, Fig. 2, the vertical arrow represents the pressure in the oil necessary to sustain the load, and the short horizontal arrow the pressure in the oil necessary to overcome the friction. The resultant

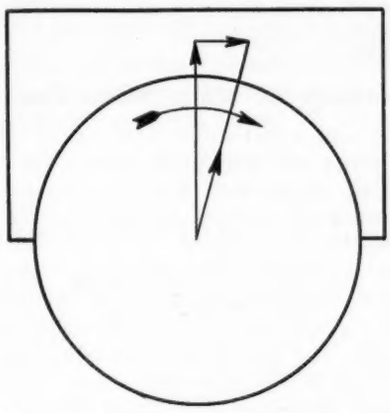


Fig. 2—Components of pressure in oil film

of these two pressures or forces is the total pressure in the oil, and when drawn as shown, the intersection of the resultant with the circumference of the journal denotes the point of maximum pressure and of closest approach. This point is always displaced from the intersection of the load line with the bearing surface in the direction of motion.

If the load rotates, as it does in the main bearings of automobile engines, the point of closest approach moves ahead of it.

Tower's Conclusions

Tower, in his report, mentions that whereas in dry friction the frictional force is constant or independent of the speed, in fluid friction it varies as the square of the speed, and he reaches the conclusion that the laws of lubricated friction approach more closely to those of fluid than of dry friction.

This statement that fluid friction varies as the square of the speed is true only under certain conditions. When a fluid flows at high speed through pipes of considerable diameter, or when a solid body moves through a fluid, the great cause of loss of energy is the formation of eddies in the fluid. The energy of these eddies which, of course, represents loss, is proportional to the mass of the eddying fluid and to the square of its velocity. The mass, in turn, is proportional to the density or specific gravity of the fluid and the velocity of the eddies is proportional to the velocity of flow or of the moving body. Therefore, the loss of energy in such a case depends upon the specific gravity of the fluid and upon the square of its velocity.

On the other hand, when the flow takes place in very restricted channels (capillary passages) there is no opportunity for eddies to form. The motion of the fluid is then of the kind known as stream line motion and the friction is directly proportional to the velocity. The density of the fluid, which has an important effect on the friction in the case of eddying motion, has no effect in the case of streamline motion, in which the friction is directly proportional to the viscosity of the fluid.

This difference between eddying and streamline motion was first established by the researches of Poiseuille, and the conditions of speed and width of channel which mark the boundary between eddying and streamline flow were experimentally established by Osborne Reynolds.

Coefficient Independent of Load

In dry friction, as shown by the experimental work of Morin and others, the friction coefficient is independent of the load and also of the speed within certain limits. The experimental results of Thurston, Tower and Lasche agree that in well lubricated bearings at constant speed the friction at first increases with the specific load and then becomes practically constant.

For the range of specific loads for which the total friction is constant the friction coefficient, of course, is inversely proportional to the specific load. The specific load for which the total friction attains its maximum value is higher the higher the temperature of the bearing. Putting the matter in a different way, with constant bearing temperature and increasing load, the friction coefficient μ decreases rapidly at first and then more slowly. This relationship is independent of the bearing materials and the lubricant used. Lasche found that for a constant temperature of the bearing of 50 deg. C. the product of the specific pressure p and the friction coefficient μ is practically constant.

$$p\mu = 0.57 \text{ lb. p. sq. in.}$$

With a nickel steel journal and a white metal bearing with oil-bath lubrication, the circumferential speed being kept constant at 32.8 ft. p. s., the friction coefficient μ decreased as the temperature increased. With a constant temperature of 122 deg. Fahr., the friction coefficient increased with the velocity until it attained a value of 0.003 at 41 ft. p. s.

That the friction coefficient is inversely proportional to the specific load is equivalent to saying that the smaller the bearing the smaller the frictional loss—so long as perfect lubrication can be maintained. This is on the basis of constant circumferential speed, and variation of bearing surface is therefore to be considered as effected by variations in length of bearing only. Reduction in the diameter of the bearing, of course, also decreases the frictional loss, by reducing the periphery speed for a given angular speed. Unfortunately, experience shows that the bearings of high speed machines must be made of large diameter and comparatively long in order to obviate objectionable vibration.

If the temperature of the bearing and the specific load are kept constant the friction coefficient μ increases with the circumferential velocity. Some of the experimenters who investigated only a narrow range of velocities attempted to express the friction coefficient as an exponential function of the circumferential velocity.

Velocity Variation

Thus it was found that up to a velocity of 8 ft. p. s. μ varies substantially as $\sqrt[5]{v}$, while at 18 ft. p. s. it varies only as $\sqrt{v}$ and between 50 and 80 ft. p. s. there is practically no change in the value of μ. Lasche found that within the limits $p = 14 - 200$ lb. p. sq. in., $t = 86 - 212$ deg. Fahr. and $v = 3 - 65$ ft. p. s., the following relation obtains between the friction coefficient μ, the specific load p and the temperature Fahr. $t - \mu p\ (t - 32) = \text{constant} = 51$, p being expressed in pounds per square inch of projected bearing area.

From this equation it may be seen what an enormous reduction in the friction between metal surfaces can be effected by the use of a lubricant. Morin's experiment showed that the friction coefficient of cast iron on cast iron when slightly greasy was 0.16. From Lasche's formula we find that for a bearing surface temperature of 132 deg. Fahr. and a specific load of 400 lb. p. sq. in. the friction coefficient is only 0.0013, or less than 1 per cent that of the coefficient for dry friction.

Relationship Questioned

It would seem that a more accurate relationship would have been found to exist if instead of the temperature of the oil the viscosity of same had been taken into consideration, because the temperature affects the friction only insofar as it affects the viscosity. But while the friction of a bearing varies with the viscosity of the oil, expressed in absolute units, recent experimental work has shown that it varies also with other qualities of the oil, and because the viscosity is not an absolute measure of the value of the oil as a lubricant, the term oiliness has been introduced.

It has been found, for instance, that the addition of a slight proportion of a fatty acid, such as oleic acid, too small to materially affect the viscosity, will greatly reduce the friction coefficient. An addition of 1 per cent of oleic acid to a mineral oil has been found to reduce the friction coefficient by as much as 17 per cent. However, the relation between the temperature of an oil and its absolute viscosity is substantially of an hyperbolic nature, which confirms the results obtained by Lasche.

The value of the conception of a friction coefficient in connection with "lubricated friction" is somewhat doubtful. A coefficient in an equation expressing a relationship between physical quantities is usually thought of as a factor remaining constant when other factors involved vary. In the case of friction between dry surfaces, for instance, the coefficient of friction is independent of the specific load and of the speed of motion to a considerable extent, whereas in lubricated friction the friction coefficient varies rapidly with the specific load and the speed of motion. In the case of motion between lubricated parts the quantity that is much more nearly constant is the total friction or the frictional resistance. The conception of the friction coefficient, however, has become so familiar to engineers that it is difficult to free one's mind of it.

Influence of Metal Slight

Three different materials were used by Lasche for the journals, viz., nickel steel, carbon steel and wrought iron, but no great influence of the journal material on the friction coefficient was noted. With a specific load of 92 lb. p. sq. in. μ was equal to 0.008 for carbon steel and wrought iron, whereas for nickel steel it was only 0.006. Nickel steel maintained a slight advantage throughout the field covered by the research, but the reason for this was not obvious, more particularly since the friction coefficients for the softest material, wrought iron, lay between those for the two harder materials, the carbon and nickel steels. Microscopic examination of the surfaces of the different journals also failed to give a hint as to the possible reason for this difference, as the pores in the surfaces seemed to be largest in the nickel steel journal.

As regards the effect of the material used for the bearing, there seemed to be some difference in the friction coefficients with different materials at light loads, but this practically vanished at higher loads. This result is rather contrary to what one would expect in view of the film theory, since the greater the specific load the thinner the film and the more closely the metallic surfaces will approach.

The friction coefficient was found to be somewhat lower with bronze than with white metals, but Lasche correctly observes that the choice of bearing metals will generally be based on other considerations, such as that overheating of a white metal bearing will generally not injure the steel journal and that with such bearings there is no danger of sudden seizing, as often occurs with bronze bearings, with the result that in high speed machinery the shaft or some other part is broken in consequence of the abnormal strains produced.

A statement of Lasche's which has since been verified in automobile practice is that bronze is preferable where the dimensions of the bearings have to be kept small and the surface velocity is low, whereas in high speed machines which have to have large diameter shafts in order to eliminate vibration, the bearings should be made of white metal.

Advantage of White Metal Bearing

In many lines of application, such as for the armature bearings of large electric generators, the white metal bearing has the advantage that as soon as the surface layer of the bearing softens through an excessive temperature rise, the hum of the machine changes in tone and thus gives warning to the engineer or dynamo tender.

The fact that bearings subjected to periodic loads will sustain much higher maximum loads than bearings subjected to steady load was observed at an early date. The most prevalent example of a bearing subjected to a periodic load and which at the same time had to be restricted in dimensions was the locomotive crankpin bearing. Tower, for instance, found that with steady loads and oil-bath lubrication the maximum specific load a bearing would sustain even at moderate speed was of the order of 400 lb. p. sq. in. In railroad practice, on the other hand, it was found that locomotive crankpin bearings carrying maximum specific loads of 1400 lb. p. sq. in. could still be effectively lubricated by drip feed and with more effective methods of lubrication this specific load could be carried up to about 2500 lb. p. sq. in.

This difference in the maximum specific loads which can be carried when the load is steady and when it is of a periodically variable nature, respectively, is explained on the theory that with a periodically variable load the maximum pressure persists for such a short period of time that the oil has no time to be squeezed out from between the bearing surfaces. The bearings of automobile engine piston pins commonly carry maximum loads of around 2500 lb. p. sq. in., which occur at the moments of explosions while the engine is running slowly under full throttle.

In Tower's experiments with the friction balance the deflection of the load arm under the force of the friction was so slight that it was difficult to measure accurately, and in order to make measurement easier he conceived the plan of reversing the direction of motion of the journal, which doubled the angle or cord to be measured. This led to the finding that when the direction of motion was reversed the friction at first was materially increased, but after the journal had been running in the reverse direction for some time, it gradually came down to its normal value.

Explanations Offered

A number of explanations have been offered for this phenomenon. One is to the effect that the friction tends to turn the ends of the metal fibres in the direction of motion, so that when the latter is reversed the motion is at first "against the grain" as it were, until the fibres

have been bent in the direction of the reverse motion, when the friction decreases again.

Osborne Reynolds offered another explanation. He states that the point of closest approach is not in the line of the load, but displaced therefrom in the direction of motion; hence if the direction of motion is reversed the point of closest approach is shifted to the opposite side of the load line and the journal has to form a new seating for itself.

In the case of the main bearings of an automobile engine crankshaft the load travels around with the crank. In certain bearings, such as the center bearing of a four-cylinder engine, the magnitude of the load is comparatively uniform at high speed when centrifugal forces are an important factor. At the top and bottom dead center positions the load is exactly in line with the crank arms, but in between it either runs slightly ahead or lags behind. The oil can be introduced into the bearing in two different ways, through the bearing or stationary part or through the shaft revolving part.

In practically all engines the oil enters the main bearings through the stationary part. Therefore, once during every revolution the point of entrance coincides with the point of maximum pressure in the oil film or the point of closest approach between journal and bearing. Tower's experiments showed that with a load whose direction is constant the oil cannot be effectively introduced at the point of closest approach or near to it. In the case of the crankshaft main bearings the load travels around, however, and this naturally makes quite a difference.

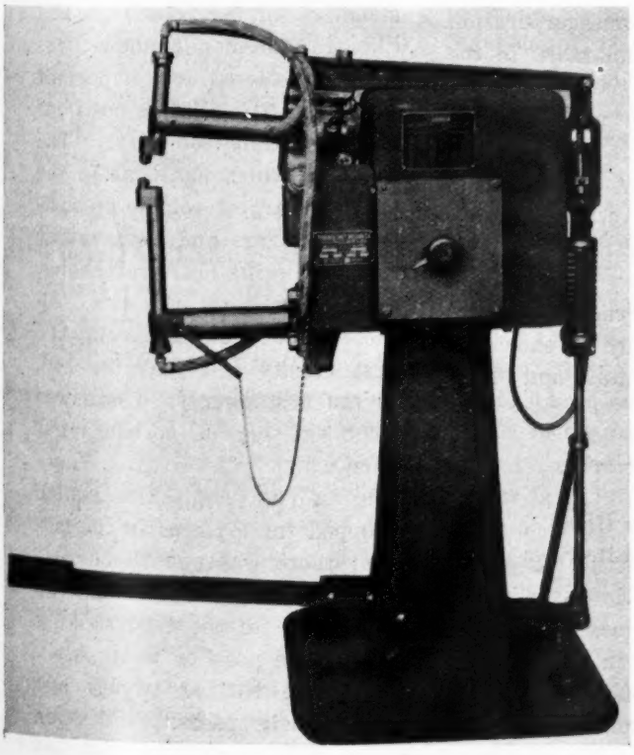
If the oil were introduced to the bearing through the journal, it could be made to enter the film at the line of minimum pressure at all times, and the question arises whether this would not insure more uniform lubrication and the ability to carry higher specific loads than the present system of introducing the lubricant through the stationary part.

The question can hardly be settled on theoretical grounds only but calls for experimental investigation.

Wide Range of Use Characterizes New Spot Welder

SPOT welders appear to be finding an ever broader field of usefulness in automotive manufacturing, especially in the fabricating of sheet metal parts. Makers of this class of equipment are endeavoring to meet the demand with more rugged and better standardized products which have a wide capacity range. A new machine of this type, known as Model No. 100 spot welder, has recently been developed by the Thomson Spot Welder Co. It is rated at 20 kw. and is said to have a range covered by 5, 10 and 15 kw. machines of the same make.

This flexibility, if it may be so termed, is due partly to means for varying the pressure applied by the electrodes and partly by a five-point switch arranged to vary the number of effective coils in the primary of the transformer, thus varying the voltage and consequently the current flow in the secondary or welding circuit. Maximum capacity is given as two pieces of 5/32-in. steel or two pieces of 1/16-in. brass or aluminum.



Model 100 *Thomson spot welder, said to be rugged yet fast in operation*

It will be noted from the accompanying cut that the machine is a pedestal type operated by pedal and an overhead lever attached to the head which carries the movable electrode. Pressure of the foot is transferred from the pedal to the overhead machine steel lever by a thrust rod and adjustable spring which controls the pressure on the work as well as the time of operation of the contacts which in turn control the magnetically operated wall switch which opens and closes the primary circuit.

As the pedal moves down, pressure exerted through the spring moves the overhead lever upward and brings the electrodes into contact with the work. Further movement increases the pressure on the work and also trips the contact which controls the main magnetically operated switch and causes the current to flow through the work. Continuing the movement further increases the pressure on the work until finally the second contact is tripped and the circuit opened. The pedal is then released, but pressure continues on the welded joint until the pedal almost reaches the off position. This is said to give ample time for the weld to set under pressure.

Features of the design include an abestos indulated primary coil said to be practically fireproof and so proportioned as to give only a moderate temperature rise; a split transformer core which can be quickly removed in case a change of primary coils becomes necessary; an improved secondary lead connection with large contact area designed to give good conductivity at the joint and thus reduce heating and consequent troubles at this point; a new design of pressure spring with adjustable means for giving easier operation and longer spring life, and machine steel, instead of cast steel, in the overhead and pedal levers. Present treadle can be bent by user to meet his particular requirements.

The horns which carry the electrodes or dies can be had in 12, 18 and 24 in. lengths and are water cooled. Solid copper dies or electrodes are standard, but water cooled die shanks or special forms of dies are available. The lower horn is adjustable and can be dropped 9 in.

Just Among Ourselves

Deliberate Deliberation on Transport Coordination

EVERYONE interested in the coordination of transportation has been eagerly awaiting the reports of the sub-committees appointed by the United States Chamber of Commerce to consider various phases of this highly important subject. It appears, now, however, that they will be kept in cold storage until just about the time Congress meets. That may or may not be good politics. It certainly will lessen to a considerable degree the public interest which has been aroused. Congress is an exceedingly deliberate deliberative body and it would be very unfortunate if the Chamber of Commerce acquired a similar reputation.

Highway Transport Report Will Not Be Revolutionary

THE committee headed by A. H. Swayne of General Motors, which has been studying coordination of highway transport with other means of communication, has completed its report and filed it with the Chamber at Washington. It contains about 20,000 words and gives a painstaking, unbiased survey of the situation. Some of the conclusions arrived at will be new to the general public, although they will constitute a comparatively old story for the automotive industry. The most important of them advocate the use of trucks for short haul, less than carload business, particularly for the collection and delivery of freight in congested terminal areas. Use of buses to supplement electric railway service also is indorsed.

Store Door Delivery Plan Is Closely Guarded Secret

WHILE the highway transport committee will advocate use of trucks for store door collection and delivery of freight, it will not recommend specifically that they should be operated by the railroad companies themselves, either jointly or individually. Back of this deliberate omission is to be found the beginning of what promises to be one of the major chapters in the development of American transportation. Details of what is being done to work out somewhat nebulous plans are a closely guarded secret. Fundamentally, they contemplate an arrangement whereby some corporation will undertake this work in the large cities of the country in close cooperation with the carriers. Whether it will be done by some already existing corporation which would be expanded to take care of it or by some entirely new organization has not been determined. At any rate it will require an enormous amount of capital and huge fleets of trucks.

Might Better Be Blind Than Dumb, White Says

D. C. Fenner is deep in the truck business and he is much interested in the relief of traffic congestion. That probably is the reason he has been invited to address the New York Association for the Blind on traffic safety. He was telling Windsor White, also somewhat interested in trucks, about this engagement. "I'm going to suggest to them," said Fenner, "that when a blind person gets some one to act as an escort across a bad crossing he should warn the person with good eyes to be careful."

"That's a good idea," commented White. "It's better to be blind than dumb, and there are a lot of dumb pedestrians." When he said "dumb" it was evident he didn't mean voiceless.

---

20 Companies Which Led Last Year Still in Van

ONE of the most interesting points connected with the drawing of space by N. A. C. C. members for the New York and Chicago automobile shows was that it disclosed few important changes in the relative positions of the leading companies. The company which has done in the year the largest volume of business in dollars and cents rather than in units has first choice, and so on down the line. All those which ranked among the first twenty last year are still in the first twenty. There was some shifting of positions but none which was startling. There were four companies which dropped three places in the ladder; there was one which rose four and one which went up three. By far the most striking changes in position were shown after the leading twenty had drawn their spaces.

More or Less Pertinent Comment on Topics of Current Interest to Men in the Industry

One Way to Get Visitors Up Into Bronx for Show

SPEAKING of the New York show, there is only one big question to answer and that is whether large numbers of New Yorkers will go all the way out to the immense field artillery armory at Jerome Avenue and Kingsbridge Road (193d Street) in the Bronx to see the display. There is a combination elevated and subway station at the door, but it means a long ride from any part of Manhattan, Brooklyn or Queens. It takes a taxicab starting from the Times Square district half an hour to make the journey. Many of these transportation difficulties could be solved, however, by the establishment of emergency bus lines to connect with subways and railroad stations on lines leading into the suburbs. This probably would be a good investment. The armory is ideally adapted to such a show. The space in the drill shed is equal to the footage on all the floors of the Grand Central Palace.

"Uncle Tom" Henderson Tells About an Early Ad

"UNCLE TOM" HENDERSON, one of the founders of the Winton Co. and one of the grand old men of the industry, attended the members' meeting of the N. A. C. C. to watch the drawing for space at the national shows. He was greeted affectionately on all sides, for everybody knows him except the young chaps who have been born since he began building horseless carriages back in 1898. He admits amazement at the size of the industry today and chuckles as he talks of the troubles of the pioneers. One of the stories he tells is about the first advertisement his company ever gave. It was a quarter of a century ago and was printed in the *Scientific American*. "It cost us $21 a week," he remarked whimsically, "which was more money than we were making, but it actually did sell horseless carriages for us, and that's more than a lot of more expensive advertising did in later years."

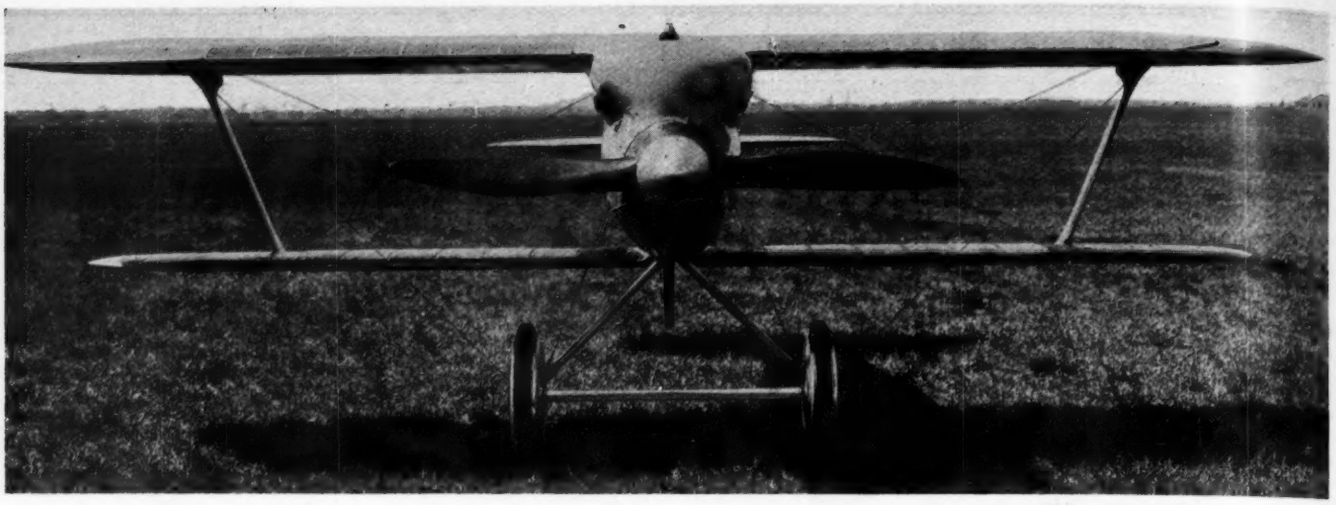
Three Business Bureaus Need More Working Capital

J. WALTER DRAKE is seated firmly in the saddle as Assistant Secretary of Commerce and he has a very definite idea of where he is going. In the first place he proposes to carry out the policies of Herbert Hoover. He has the same vision as his chief of the possibilities of the business bureaus of the Department. When he made heavy personal sacrifices to accept the job, Drake asked that the Bureau of Foreign and Domestic Commerce, the Bureau of Standards and the Census Bureau be placed under his direct supervision, and this has been done. He is thoroughly in sympathy with a program of governmental economy but, as he pointed out the other day, these three bureaus, all of them striving to build outlets for American business and all of them doing it with steadily increasing efficiency, took only $9,000,000 of the $22,000,000 appropriated for the Department this year. If these bureaus are to function efficiently they need a little more working capital. They should have it, and every one interested in the work they are doing should use their influence to see that they get it.

Chief Should Be Named for the Automotive Division

THE automotive division, in which the industry is peculiarly interested, offers a striking example of the handicaps under which an undermanned and underpaid government division operates. Its activities and the calls upon it for information and data have increased tremendously in the past year. The number of inquiries has grown almost daily as automotive manufacturers, one after another, have learned something definite about the possibilities of foreign trade. The division has little more help than it had a year ago and the members of its staff are working day and night in an effort to keep up. This division certainly needs a larger appropriation and it must have it to operate efficiently. It is high time, also, that some decision was reached in reference to a permanent chief. A commendable but thus far futile effort has been made to obtain the services of a high type "dollar a year" man. If such a man cannot be found in the very near future, however, the position should be given to someone else who will know that he has been assigned the job definitely and can proceed on that basis.

J. D.



Front view of Curtiss-Navy racer which broke all speed records in winning the Pulitzer Trophy

Curtiss Plane, Pulitzer Race Winner, Embodies New Design Features

Navy entry breaks all previous speed records. Differs from past year's design in several important characteristics. The controlling mechanism has been changed materially, the engine altered slightly, and a new duralumin propeller is employed.

FLYING at a rate of 243.67 m.p.h. and breaking all previous speed records, a Curtiss-Navy plane won the Pulitzer Race in St. Louis last Saturday. Last year a Curtiss plane also won the big air classic, but this year's winner differs from its predecessor in several important design features.

Changes have been made in the controlling mechanism, the landing gear, the engine and the propeller. Major design characteristics, however, differ little from those of the 1922 machine, which was described in AUTOMOTIVE INDUSTRIES of Nov. 9, 1922. The wings are of the Curtiss multi-spar type, covered with plywood; the monocoque fuselage has been built a little narrower and the whole tail group, while changed little in design, has been made more rigid, to take care of the extra strains caused by increased speed.

The controlling mechanism on this machine is entirely new. The "stick" can be moved through a certain angle from its normal or central position without producing any change in the position of the ailerons and elevator; if it is moved beyond this angle the motion of the ailerons or elevator corresponding to a given angular motion of the "stick" gradually increases, so that more pressure on the stick is required to bring it to the extreme position than to any intermediate position. By this arrangement the weaving or swaying of the machine when taking off or landing is minimized, as the fore and aft movements of the "stick" for controlling the elevators will not affect the ailerons, i.e., the lateral stability.

The arrangement of the two landing gear struts has been changed. Instead of being fastened on each side of the fuselage, as formerly, they are now anchored at one point in the center, just ahead of the leading edge of the lower wing. The struts have been carefully streamlined with fairing, while the spreader has been faired to act as lifting surface.

The shock absorbing device is new to the Curtiss machine. The orthodox method is to mount a short shaft, upon which the wheel is set, to a fixed axle on the undercarriage and to secure the shaft by rubber cords. This has proven satisfactory, but the spools of rubber cord offer appreciable parasitic resistance at high speed, which the new Curtiss internal shock absorbing wheel eliminates. The wheel proper consists of a rim with short spokes connected to a roller bearing hub having a diameter of approximately 12 in. The hub, which is held to the central axle or spreader of the undercarriage by rubber cords, is retained on the axle by a large flat-headed bolt threaded into the shaft. The cushioning effect of the tires is supplemented by stretching of the rubber bands within the wheel itself, enabling the machine to land safely at high speed on rough ground. The arrangement helps to give the whole wheel a better streamline effect and eliminates the drag set up by the usual device. Wheels and tires are completely covered with fabric.

Engine Changes Slight

The engine is similar to the Curtiss C-12 used in last year's machines, the major change being an enlargement of the bore by ⅛ in., the cylinder dimensions now being 4⅝ by 6 in. The compression ratio has been increased

from 5.7 to 5.9. This, together with the enlargement of the bore, has resulted in increasing the output by 50 hp., the new engine delivering 508 hp. at 2350 r.p.m. The engine is said to peak at 2650 r.p.m. The weight of the engine minus accessories is less than 600 lb., which, when compared with the nominal horsepower of 500, shows a weight-power ratio of 1 1/5 lb. per hp. A tubular metal frame support for the engine has replaced the former wooden engine bearers. A mixture of gasoline and benzol in equal proportions was used.

A Curtiss-Reed one-piece duralumin propeller, measuring 7 ft. 10 in. in diameter, is employed. It is the invention of S. A. Reed, and is covered by a patent issued July 31, 1924. Reed, who is an expert acoustics engineer, evolved the propeller for aeronautical use while carrying on experiments on a sound-producing device for use in signaling work.

The propeller is formed by twisting a drop forged slab of duralumin, shaping it by cutting machinery, heat treating it and finally finishing it with a buffing wheel. It is claimed that metal propellers have resulted in increasing the speed of high-power machines by from 8 to 10 m.p.h. without increasing the r.p.m. of the engine.

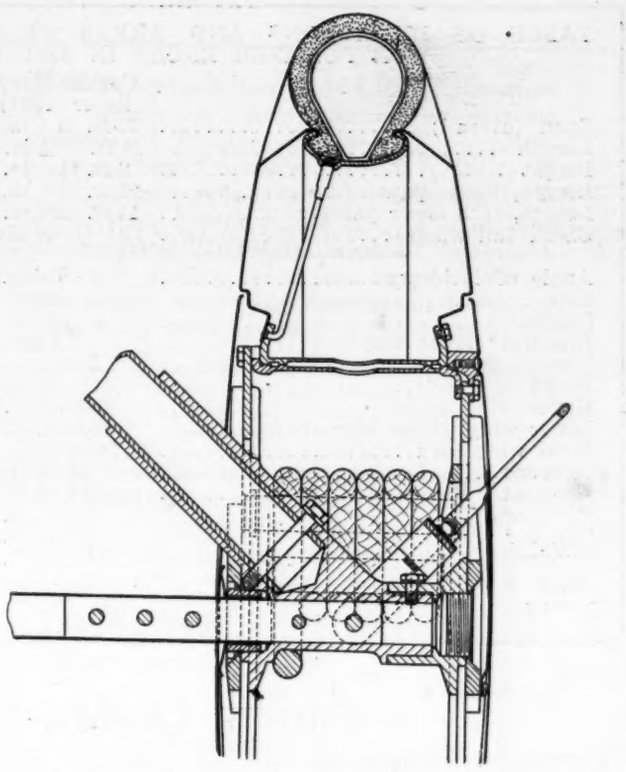
Wing Type Radiation Retained

The wing type radiators, the value of which was demonstrated in last year's Pulitzer Race, are retained. Both upper and lower surfaces of each set of wings are fitted with radiators, which extend almost to the interplane struts. A new feature which should prove of value in service, particularly in cold climates, is the method of "warming up" the engine.

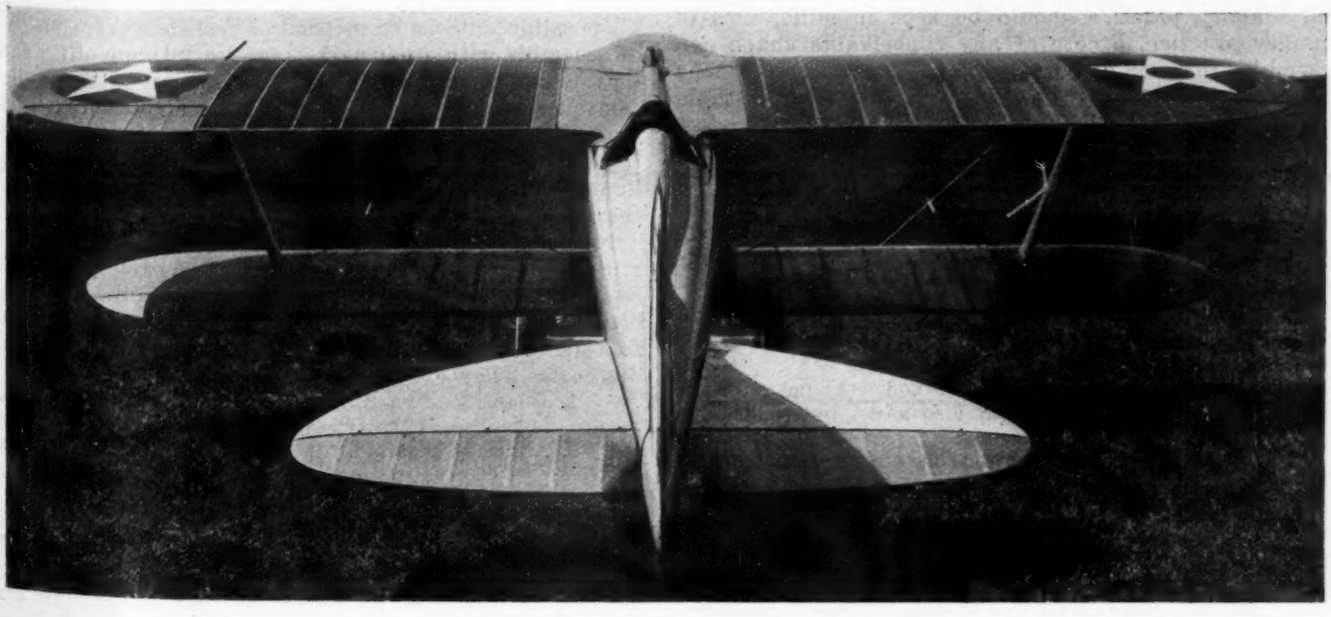
Ordinarily, before taking off the engine must be run for from 10 to 15 minutes in order to bring the water up to a temperature where the engine will function most satisfactorily. By means of a by-pass actuated from inside the cock-pit, all except one section of the radiator are cut out while "warming up" the engine. This makes it possible to open the engine out full after four to five minutes of idling, and the by-pass may then be opened and the engine run at full throttle without fear of misfiring due to incomplete vaporization of the fuel.

The value of extensive wind tunnel experiments in developing racing and experimental models was again demonstrated. After research work covering a period of four months, during which every lifting and non-lifting surface, as well as the complete model, was subjected to tests in the Curtiss 7 ft., 100 m.p.h. wind tunnel, the complete airplane, after its initial flight, was pronounced by the pilot to perform satisfactorily in all respects, as regards both stability and performance. No structural changes whatever had to be made on the machine. It is interesting to note that the maximum speed so far developed by the racer is only 2 m.p.h. higher than the maximum speed calculated from wind tunnel experiments on models.

Each succeeding year the designs of the Curtiss racers have shown a more compact streamline job, with the number of non-lifting surfaces reduced to a minimum.



Cross section of the internal shock absorber wheel



Rear view of Navy-Curtiss plane, showing stream-lining

TABLE OF DIMENSIONS AND AREAS OF CURTISS PLANES WHICH WON PULITZER RACES IN 1921, 1922 AND 1923

	Curtiss-Navy Racer (1921)	Curtiss-Army Racer (1922)	Curtiss-Navy Racer (1923)
Span (overall)	22 ft. 8 in.	19 ft. 0 in.	19 ft. 3 in.
Length	21 ft. ½ in.	18 ft. 11 in.	19 ft. 8½ in.
Height	8 ft. 11 in.	7 ft. 10 in.	8 ft. 1 in.
Length, upper panel	22 ft. 8 in.	19 ft. 0 in.	22 ft. 0 in.
Length, each lower panel	10 ft. 2¼ in.	8 ft. 10 in.	19 ft. 3 in.
Chord (all wings)	48 in.	46 in.	Upper 56 in. / Lower 40 in.
Angle of incidence	0 deg.	0 deg.	0 deg.
Gap	48 in.	46½ in.	38 in.
Stagger	15 in.	7½ in.	11¼ in.
Dihedral (lower only)	2 deg.	0 deg.	0 deg.
Sweepback	None	None	None
Tread of wheels	60 in.	58½ in.	54 in.
Upper wing panel	88.0 sq. ft.[1]	68.4 sq. ft.[2]	43.2 sq. ft.
Lower wing panels with ailerons	80.0 sq. ft.	62.74 sq. ft.	28.92 sq. ft.
Total wing area	168.0 sq. ft.	138.0 sq. ft.[3]	148.25 sq. ft.
Ailerons	17.6 sq. ft.	9.25 sq. ft.	9.84 sq. ft.
Horizontal stabilizer[2]	12.6 sq. ft.	11.2 sq. ft.	15.32 sq. ft.
Elevators[2]	9.2 sq. ft.	6.9 sq. ft.	8.64 sq. ft.
Tail fin[1]	4.8 sq. ft.	4.9 sq. ft.	5.7 sq. ft.
Rudder[1]	4.8 sq. ft.	4.9 sq. ft.	4.96 sq. ft.
Wing loading	.....	.....	14.1 lb.

[1]Had no ailerons. [2]Including ailerons. [3]Including stubs and landing gear fairing.

This year's machine has the top wing integral with the fuselage, two single interplane struts and only one landing and two flying wires in each bay.

Sheer maximum horsepower no longer governs the speed of an airplane and, consequently, all surfaces offering resistance have been streamlined to the limit.

The fairing has been brought up to a position in front of the pilot's face, then carried from behind his head down the fuselage until it finally unites with the vertical fin.

The pilots claim that this design enables them to fly the machines at maximum speed without the necessity of wearing goggles.

Careful Design Lowers Production Cost

AUTOMOTIVE engineers engaged in design work can often save considerable money for their companies by having a thorough knowledge of the production limitations and possibilities of the industries which are to make the parts which they design. Often the change of a small angle or curve will not lower the performance qualities of a part, but may result in considerable saving in manufacturing cost. This is true particularly in the design of forgings, castings, and other units of similar character.

Some very practical suggestions along this line and in regard to ordering such products, contained in a little booklet recently put out by the Doehler Die-Casting Co., will be of interest to many engineers. Discussing the rules that may be observed advantageously in the design of die-castings, the booklet says in part:

In designing parts for the die-casting process, one fundamental difference between the die-casting process and foundry practice should be kept in mind, viz., in foundry practice, a core of any conceivable shape can be molded in sand, and when the casting has been made around the core it can be destroyed and removed from the casting. In die-casting practice, all steel cores are used (which obviously cannot be destroyed after every casting) and means must be provided for removing such cores. Summarized, it resolves itself into the general rule—*Avoid Undercuts*. Although undercuts cannot generally be cast in the die-casting process, the exceptions to this rule are numerous.

The designer should bear in mind the following primary rules:

1. Avoid undercuts.
2. Avoid sharp corners. Fillets and webs not only add strength to the part, but also assist in producing a better casting.
3. State limitations required on all vital dimensions. Do not allow for shrinkages.
4. Apply inserts where special qualities are required. (See folowing paragraph "Inserts").
5. Lettering can be cast either raised or depressed. Raised letters are less costly and more practical. Depressed panels with raised letters frequently answer the same purpose as depressed letters.
6. Make use of the advantage of thinner walls which the die-casting process offers.
7. Bear in mind the possibility of combining several parts into one unit which is made possible by the die-casting process.
8. It is not economical nor practicable to die-cast parts which can be produced by sand-casting process and can be used without machining. Generally speaking, we cannot compete with simple stamping or screw-machine products.
9. Before specifying alloy to be used, consider qualities and adaptabilities as stated in following description of alloys.
10. When alloy is selected, give due consideration to limits and characteristics as stated by us in our alloy descriptions.

The best procedure in designing a die-cast part is to confer with our engineers and obtain their advice based on many years of experience. Where personal consultation is not possible, a model or blueprint of the part should be submitted. This should be accompanied with all possible data as to method of use in service, method of assembly with other parts, etc. Very frequently a part that is apparently "impossible" from an orthodox die-casting viewpoint becomes quite practicable through the ingenuity of our engineers. The service of our engineering department is always at the command of our customers in designing parts for practicable production by the die-cast process.

No general rule can be laid down for the rapid determination of the cost of die-casting dies. Every job must be studied individually and the design of die, labor, die-steel, etc., involved must be considered. Two basic factors exist, however, that tend to govern the initial die cost. They are:

1. Quantity of castings required, since upon this factor is dependent the type or multiplicity of the die.
2. Accuracy required. It is a well-known fact that the cost of constructing any piece of tool work is largely dependent upon the degree of accuracy required.

In ordering die-castings, it is more than important to keep constantly in mind the slogan, "Be sure you are right, then go ahead." While some changes may be simple and inexpensive, as a general rule die changes are expensive, and sometimes impossible.

Agricultural Sections *are* Best Market *for* Low Priced Vehicles

IOWA, population 2,404,021, absorbed nearly as many cars in the first six months of 1923 as did New York metropolitan district, population 6,257,200.

Sixty per cent of Iowa's purchases, however, were Fords, while only 21 per cent of the New York total were of this make.

Some striking facts are brought out in this article which analyzes recent Iowa and New York sales figures.

By James Dalton

IOWA, with a per capita registration of motor vehicles denser than any other State save one, undoubtedly is fairly representative of agricultural commonwealths so far as its appetite for automobiles is concerned. Generally speaking, there is not much variety in the diet and it runs strongly toward wholesome but inexpensive food.

For this reason, those companies which cater to this market might well study a recent analysis of new passenger car sales in Iowa for the six months ending July 1. The total of sales was 45,220, of which 16,939, or 37 per cent, went into urban counties and 28,281 into rural counties. Part of the sales in urban counties of course, were to farmers.

Notwithstanding the fact that farmers are not especially prosperous, Iowa consumed a surprising number of automobiles. The record it made shows the importance of cultivating the agricultural markets religiously. These figures disclose rather a surprising state of affairs:

Iowa, with a population in 1920 of 2,404,021, bought 45,220 motor cars in the first six months of 1923.

The New York metropolitan district, including the five counties in the greater city, together with the counties of Westchester, Nassau, Suffolk, Rockland and Putnam, with a population in 1920 of 6,257,200 bought 50,289 in the same period.

New York Tastes

New York's appetite was somewhat different from that of Iowa, however. A fraction more than 60 per cent of the 45,220 sold in Iowa, or 27,473 to be exact, were Fords, while only 10,810 Fords, or 21 per cent of 50,289, were taken in the metropolitan district.

Excluding Ford, however, and taking eleven other companies exclusively in the less than $1,000 class, the similarity of sales is rather striking, Iowa having taken 10,314 and New York 14,235. Sales of Chevrolet, Dodge, Overland and Star in the two sections were about the same.

Another wide divergence was found in combined sales of Buick and Studebaker. New York took 10,534 in the six months and Iowa only 3,461.

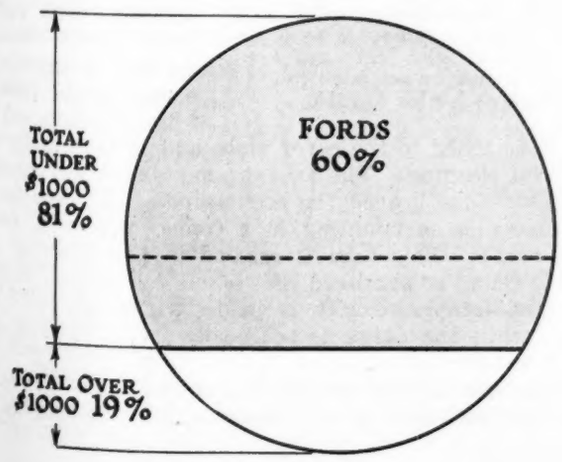
Sales in Iowa

Including Ford in the cars under $1,000, the total in this class in Iowa was 37,785, or 81 per cent, while in New York the total was 25,045, or 49.8 per cent.

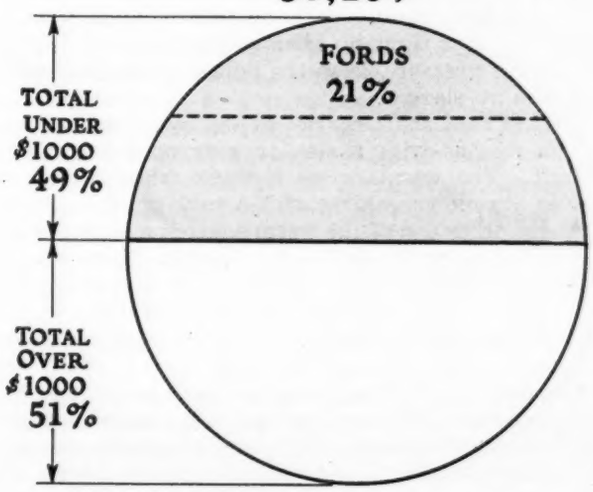
Total sales in Iowa of cars listing roughly in the more than $2,000 class were approximately 500, while in New York they were 5500. The Iowa percentage in this class was about 1 and in New York a trifle less than 10. Packard and Cadillac alone accounted for 272, or more than half the Iowa total in this class. Five other companies, combined, sold 158, making a total for the seven of 420. This left about 80 to be divided among all the other lines represented in that field. Two sold one each, two others two each and two more four each.

It is obvious from this somewhat superficial analysis that the less expensive the car the greater the demand in an agricultural State. Competition for the relatively few sales above $1,000 is exceedingly keen. This always has been true to a considerable extent in farm markets and probably will continue to be. The financial status of farmers will have something to do with the market, of course, but relatively few agriculturists are likely to

CAR SALES IN IOWA
FIRST SIX MONTHS OF 1923
45,220



CAR SALES IN METROPOLITAN NEW YORK
FIRST SIX MONTHS OF 1923
50,289



plunge heavily in car buying. Doubtless most of the cars in the more than $2,000 class sold in Iowa went into the cities and larger towns.

The main point involved in any consideration of this character is how much money companies making cars in the higher price class want to spend in sales efforts in the farm States. It would seem that until these sections become more prosperous than they are now, such sales will be rather expensive. On the other hand, it is apparent that makers of less costly cars can find a good market even today in rural territories. The comparison of business in Iowa and metropolitan New York would seem to indicate that there is greater profit for them in farming States than in business and industrial centers.

There is nothing surprising in the proportionately larger sale of automobiles in rural Iowa than in metropolitan New York. Going back to the horse and buggy days, all farmers had conveyances of some kind while comparatively few city dwellers had their own carriages. All farmers and most residents of small towns have buildings in which they can keep cars and they have no garage rent to pay, which is a big consideration for the person of moderate means in the city. This of itself will mean that a larger percentage of the populations in agricultural States will own automobiles, although the average earnings of city dwellers are considerably higher.

If such sales analyses could be prepared covering all rural and urban districts, they might show the need of some revision of factory selling effort. However, it would be interesting to know how much more it cost to sell 37,785 cars in the less than $1,000 class in Iowa than it did 25,045 in New York. It also would be interesting to know the percentage of exclusive dealers.

Such speculations as these serve merely to emphasize the need for more complete statistical data on the automotive industry.

New Production Drill Requires Little Floor Space

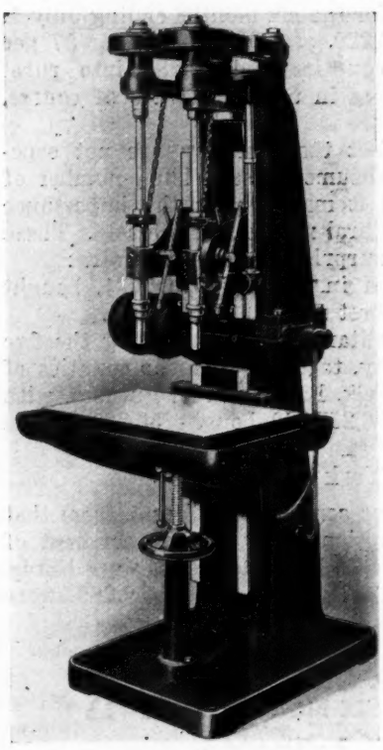
COMPACT and substantial construction, high production rate and small upkeep expense are among the outstanding advantages claimed for a new line of high-speed production drills, termed Viktor Class R, just being placed on the market by the Henry & Wright Co. These are self-contained units, only one part of which, the motor, extends beyond the base and table castings. All vertical belting and overhanging pulleys are eliminated so that the machines can be set back to back and table to table, thus occupying a minimum of floor space. At no time is operator required to go back of the machine. Parts requiring adjustment or lubrication are accessible from the front.

These drills are made with any number of spindles from one to eight, all of which are driven by bevel gears from a common transverse shaft at one end of which is a 1, 2 or 3-hp. horizontal electric motor running at 1750 r.p.m. (or, if preferred, a tight and loose pulley), and at the other a gear pump capable of handling 4 gal. of coolant per min. at 6 to 8 lb. per sq. in. pressure. Cross shaft and gears are fully inclosed, and run in oil.

Each vertical shaft carries a pulley at its upper end. This drives by 2-in. horizontal belt to the spindle pulley. Feed is by vertical shaft driven off the spindle by two three-step cones with ¾-in. belt and one pair of reduction gears, the ratio of which can be changed to give feeds as high as 1/16 in. per rev. Normally feeds of 4, 6 and 8 thousandths in. per rev. are furnished by step cones and gears of standard ratio. Both spindle-drive and feed-drive belts are kept tight by idler pulleys on arms which, through spring pressure, keep the pulleys in contact with belt and take up slack.

The vertical feed shaft carries at its lower end a bevel gear which meshes with a similar gear on a horizontal worm shaft. The worm drives a worm wheel which in turn drives a pinion meshing with a rack on the spindle quill. At the other end of the worm shaft is a clock spring which is wound up as the drill is fed downward and assists in returning the drill on its up stroke. The tension on this spring is easily varied to control speed of return.

Drills can be fed by hand or be set for automatic or semi-automatic feed as desired. With a full automatic setting the drill is fed downward, returned and again fed downward automatically, continuing these motions successively until stopped by hand. With semi-automatic setting, drill is fed downward and returned but not fed downward again until started by hand, after which it feeds down and up again automatically and remains in up position until again started down by hand. Adjustable collars can be set to control the positions at which feed starts and reverses. Engagement and disengagement of positive feed is effected by meshing and disengaging the worm and worm wheel.



New Henry & Wright drill for production work. Driving mechanism is self contained so that machines can be set back to back and table to table

Changes of spindle speed are easily effected by changing four pairs of pulleys which give a speed range from 339 to 2418 r.p.m.

Both spindle supports and table are adjustable for height. The table has an integrally cast gutter from which coolant returns by gravity to a tank in the base of the machine. This tank is attached to the cover plate and is thus easily removed for cleaning. The coolant pump discharges through a pipe with tee branch for each spindle. At each tee is a flexible pipe terminating in a copper tube with small outlet nozzle. This tube is carried in a substantial adjustable clamp so arranged that a small stream of coolant with considerable velocity is projected at the point required, while the nozzle is not easily jarred loose or the stream misdirected.

All important bearings are of the ball type. Traverse of spindle rack is 6½ in. Distance between spindles is 9 in.

United States Should Assume Leadership in World Highway Development

Widespread use of automobiles has brought astounding growth of road mileage in this country. Other nations look to us for advice. Two important transport gatherings are scheduled

SOME of the older nations of the world knew a great deal about the building of good roads while Americans still were doing most of their traveling over trails and what were quagmires several months of the year. Hard surfacing of highways, except city streets, is only about 20 years old in this country and had it not been for the automobile conditions today probably would be much the same as they were in 1903.

Americans usually get what they want in the way of public improvements and when the motor vehicle began to come into general use the persons who used them, generally large taxpayers, demanded better highways. Thus began the "good roads" movement which has assumed almost unbelievable proportions and has involved expenditures running to a fabulous sum.

As the wealthiest nation in the world it was only natural that the United States should assume the leadership in road building once it got under way. All other countries now regard us as their mentor in highway and highway transport problems. They are coming to us for practical lessons.

The world is realizing, albeit somewhat dimly, that much of our astounding development and accumulation of wealth in the past two decades has been due to improved highways and the motor vehicle. For this reason, if nothing else, it is unfortunate that the United States is not a member of the International Good Roads Congress.

Happily, however, some of the far-sighted men who know that more and better roads in other lands will do much to advance the world's prosperity and further fortify this country's fortunes, have taken concrete steps to promote modern highway construction in all quarters of the globe.

Seville Congress Failure

It is now conceded that the international congress at Seville, Spain, early this year was a failure so far as practical results were concerned. The reasons for this failure as outlined by W. Rees Jeffreys, chairman of the Roads Improvement Association of England were:

1. Not sufficient business meetings.
2. Discussion practically confined to government delegates while ordinary members were discouraged from taking part in the debates.
3. Too much time devoted to formal meetings, complimentary speeches and sightseeing.
4. Little or no road work of interest to be seen.
5. General reports and resolutions which formed the basis of the discussions were not in the hands of members until the opening day.
6. Resolutions were prepared by Spanish general reporters, who were influenced by the restricted range of practical experience afforded by the Spanish road system.

As a result of this experience, Jeffreys makes the following suggestions for future conferences:

1. That they be held only in readily accessible capital cities where modern forms of highway construction can be examined.
2. That there shall be more business meetings so that all members can take part in the debates and discussions.
3. That purely sightseeing excursions be eliminated and that their place be taken by road and other inspections of interest to road engineers.
4. That formal meetings and courtesy speeches be reduced to a minimum and that social affairs be confined to the evenings.
5. That general reports and resolutions should be circulated at least three weeks before the congress.
6. That the resolutions which form the basis of discussion should be framed by persons who are recognized authorities on the subjects to be discussed.
7. That time and facilities should be provided for representatives from the same countries to meet informally and coordinate their views.

Authorities in Accord

American highway authorities are in perfect accord with the views voiced by Jeffreys and arrangements already are being made for two international conferences, to be held in this country, which will be conducted along the lines he suggests. The automotive industry should feel a deep interest in these meetings because of the influence they are likely to exert on exports. Every mile of new road in other countries means a new market for automotive products just as it does in this country.

From the viewpoint of business, the more important of the meetings will be the Pan-American Road Congress to be held in this country next year. The date and place have not been fixed. It now seems probable that this session will be preceded by a highway congress of English-speaking nations, also in the United States, some time this year. The Pan-American meeting will be preliminary to a more pretentious conference to be held later in one of the Latin-American capitals.

The Department of Commerce, the Bureau of Public Roads and other governmental agencies are cooperating actively in bringing about both these conferences. Preliminary plans for the earlier conference contemplate bringing to this country, under the personal direction of Sir Henry Percy Maybury, director-general of roads in the ministry of transport, 100 delegates representing England and her colonies. Their expenses would be paid by the British Government. Cooperating in arranging this meeting are the American Association of State Highway Officials, the American Road Builders' Association, the Highway Education Board and the Advisory Committee on Highway Research.

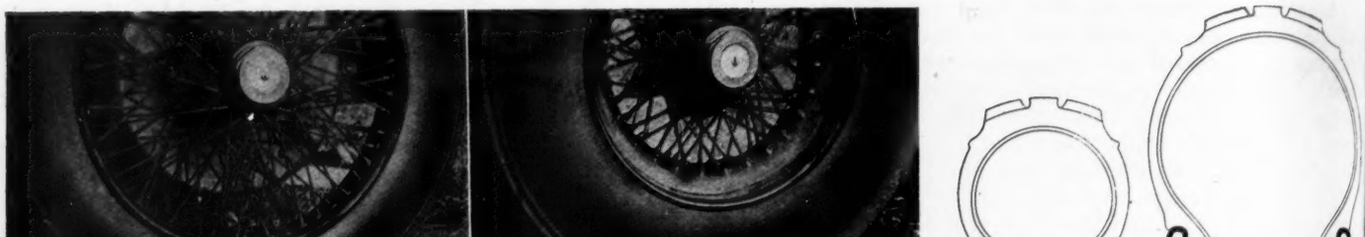
The Pan-American meeting will be under the general auspices of the Department of Commerce and arrangements for it will be directed by J. Walter Drake, assistant secretary, through an advisory committee representing all organizations interested in the world-wide development of better highways.

Both these highly important conferences will be of a "shirt sleeves" character. The delegates will be shown exactly how American roads of all types are constructed, together with the actual operation of highway transport, both freight and passenger. They also will be given opportunity to study American production methods by visits to truck and passenger car factories. The discussions will be highly practical and they will be led by experts, but opportunity will be given for an exceedingly free and frank expression of opinions by all delegates. Social obligations will be limited to a comparatively few evening functions.

Another conference at which considerable attention will be given to highway problems will be the International Motor Transport Congress, which will be held in Detroit next May under the auspices of the National Automobile Chamber of Commerce, although this event is designed primarily to bring here foreign distributors and dealers representing American manufacturers.

These three meetings will be the most important of the kind ever held in the United States. If they are successful, as they undoubtedly will be, they are likely to exert a strong influence upon road building in other countries. The automotive industry has a deeper direct interest in them than any other and they should have its wholesouled support.

Dunlops to Introduce Low-Pressure Tires



Left: Equivalent Dunlop normal and low-pressure tires on wire wheels. Right: Sections of standard 3½-in. beaded edge tire and the equivalent Dunlop 5-in. low-pressure tire with wired edges and sunken base rim. Note molded ribs overlapping rim edges, which are claimed to prevent the casing from becoming detached when sudden deflation occurs.

IT has been an open secret in England for a long while past that the Dunlop company was experimenting with low-pressure tires, and it is now announced that the outcome of these experiments will be shown at the Olympia passenger car show in November. The company states that it has been running cars with low-pressure tires since 1916, but that it has refrained from offering this type until satisfied by the progress of developments that the advantages will outweigh the drawbacks.

Like the "balloon" tires of the United States Tire Co. and the Michelin "comfort" tires, the Dunlop "low-pressure" type is of much larger section and lighter construction than normal. In the method of attachment, however, Dunlop's differ from the others, for the casings are of the wired-edge type, identical in principle with one of the company's earliest patents—that of 1890 relating to the Dunlop-Welch wired-on bicycle tire.

The rim is an adaptation of the Dunlop-Welch cycle rim, and is a one-piece unit having a circumferential well or sunken base enabling the casing to be fitted or removed, it is claimed, with the utmost facility and without the use of any tool. When in place the tire is said to be absolutely secured and cannot become detached unintentionally even when run deflated, the wired edges being retained in position by a special molded safety rib which rests over the rim edge. Tests are said to have demonstrated the complete reliability of this attachment and to have shown that neither punctures nor sudden deflation at high speeds are a source of danger.

The new tire and rim equipment will be offered in substitution for all existing sizes of normal pneumatic tires and will efficiently carry the same loads. The rim diameters will be the same for all sections of tires, viz., 20 in. at the tire seating, thus permitting of simple interchangeability—each rim being capable of taking as an oversize the tire of the next larger section. The overall diameters of the tires are such as can be generally accommodated by the clearances provided for normal sized tires, and little, if any, disturbance of gear ratios will be occasioned. Incidentally, the well-base type of rim can be incorporated with wheels of any type—wire, artillery, disk, wood or pressed steel with hollow spokes.

It is considered that only the extended experience of motorists generally can determine how far these large section, low-pressure tires will eventually displace existing standard types. It is believed, however, that their increased cushioning capacities and bold appearance will appeal particularly to the makers and users of light cars.

IN the course of a discussion on Specifications for Magnet Steels in Engineering of London the point has been made that the true criterion of the value of a steel for use in permanent magnets is the ratio of the available external magnetic energy to the cost per cubic centimeter.

At the present time this quantity is said to have the following approximate values of straight bar magnets cut off and hardened only, with no allowance for machining, grinding, bending or finishing: Low grade chromium steels, 56,000 ergs per penny; high grade tungsten steels, 34,000; cobalt-chromium steels (medium cobalt) 22,000; high cobalt steels, 21,000.

Two Pneumatically Synchronized Engines Used in New Railcar

Standard railway coach, adopted in preference to lighter automotive construction, requires more power than single stock unit will develop. Clutches, gears and throttle controlled by air. Double end operation a feature. Brake compressor electrically driven.

ONE solution of the problem of converting ordinary railway coaches into self-propelled railcars has been worked out recently in rather unusual fashion by the Oneida Manufacturing Co. In this case two Model 6-B, six-cylinder Continental engines, said to develop 70 hp. each at 2200 r.p.m., are employed. One engine is arranged to drive the inner axle of the leading six-wheel truck, while the second engine drives the corresponding axle on the six-wheel trailing truck.

Of particular interest is the pneumatic means for controlling or, as it is termed, synchronizing the two engines. This is accomplished by diaphragms and connecting linkages which govern the position of the carbureter throttles in accordance with air pressure which can be varied at will by the operator. A quite similar arrangement is employed for shifting gears, for disengaging the clutches of the two engines, and for controlling the position of the pairs of bevel ring gears, which are arranged to drive the car at full speed in either forward or reverse directions.

Other unusual equipment in this car includes a Kohler generating set of 2500-watt capacity, which provides current for operating a 1½-hp. 110-volt d.c. motor which drives a two-cylinder Westinghouse air compressor. This generating set also provides current for interior lighting, for headlights and for operating a motor which drives a ventilating fan and other fans used in connection with the radiators of the engine cooling system which are carried on the roof of the car. The generator set, which is driven by a four-cylinder gasoline engine of 2-in. bore and 3-in. stroke, running at a speed of 1000 r.p.m., also supplies electric current for the motors used to start the two engines. It is arranged to start automatically whenever any electric circuit is closed and to stop as soon as all circuits are broken. On this account, only one small 24-volt storage battery is required.

MOST of the railcars described heretofore in these columns have been essentially truck or bus designs with such modifications as are needed for rail service.

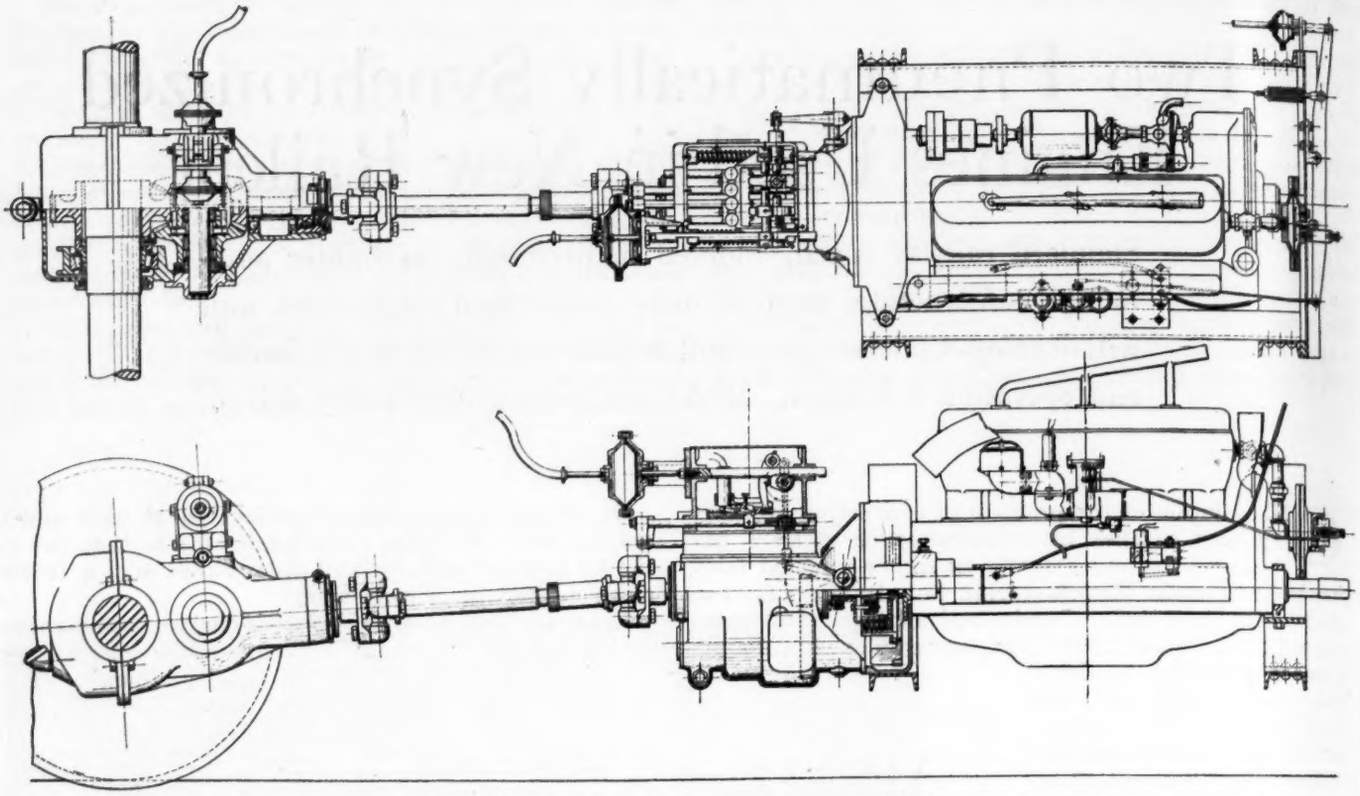
Such cars have been criticized by railway men who are accustomed to exceedingly heavy coaches. Lack of control features which enable operation from stations at both ends of the car and thus make it unnecessary to turn the car around has also been the subject of adverse comment.

In the car here described automotive parts, including two complete power units, are fitted to a conventional railway coach. Extra weight is offset by double the power available in automotive railcars. Special control features enabling operation from either end overcome the other objection cited. While this arrangement adds some complication, it gives, besides the advantages mentioned, other good features which are worthy of study by those interested in this class of equipment.

Operators' compartments are located at each end of the car and the controls are duplicated so that the car can be handled equally well from either end, a feature much desired in railway work.

From the foregoing it will be noted that this railcar differs radically from the conventional automotive type of railcar which is built very much after the pattern of a motor bus. The makers of the equipment in question are preparing to supply it for use on railway coaches already in existence as well as to fit it to cars of special design which may be preferred to existing equipment. In following this policy the Oneida company is catering to a large group of railway officials who prefer conventional railway rolling stock to the lighter form of construction which is necessarily used in automotive railcars on account of the limited power available from engines of well-tried designs and of a size which are now to be had in quantity production. The makers of the equipment here described were unable to find an engine, of sufficient power to propel a heavy car, which could be had in quantity production and had already been produced for some time in sufficiently large quantity to warrant the assurance of dependable service. It was therefore decided to use two smaller engines which had been produced in quite large quantities for bus applications and had consequently undergone the tests of average usage.

In practical operation this arrangement offers a number of advantages which are not to be had with a single engine. In the first place it increases the factor of safety, since it is possible to continue a run with one engine in case the other fails or gives trouble. Since the power required in starting is said to be about double that necessary to maintain a normal speed, it is possible to use both engines in starting and one for normal running, this one being operated at a much more efficient



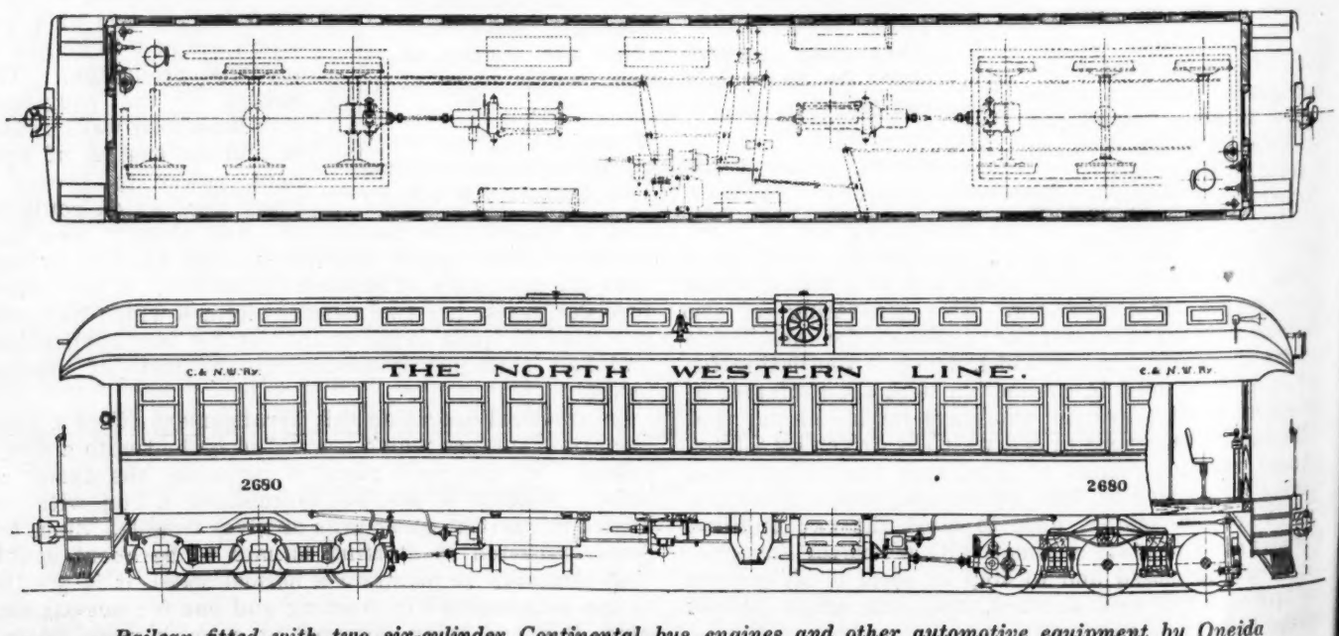
Power and transmission units with pneumatic control features as fitted to conventional railway coach. Double ring gears in axle make possible full speed in either direction

load than if a single engine were employed and operated at half load.

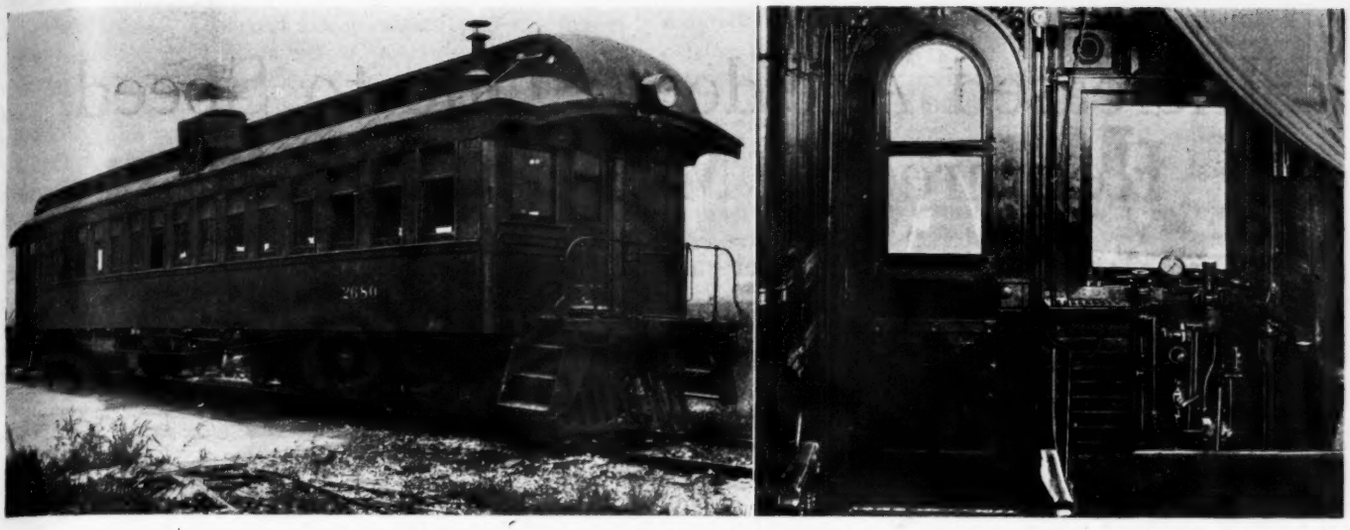
From the accompanying drawings it will be observed that each engine is connected to its respective axle by a clutch, gearset and propeller shaft, which are substantially identical with those employed in truck and bus service. In fact, units of this type were purposely selected in order to take advantage of the quantity production and availability in service of automotive parts. The gearset is a Cotta unit employing constant mesh gears with sliding clutches giving the ratios of 5.2 to 1 in low, 2 to 1 in second and 1 to 1 in high gear.

Full details of the controlled mechanism are not available, but the selection of the gear is said to be accomplished through solenoids, presumably operated from switches in the control compartment. Actual gear shifting is accomplished by air pressure. The clutch, which is a Detlaff multiple-disk type, is also pneumatically disengaged.

From the gearset a propeller shaft with universal joints at each end drives to the axle through a bevel pinion. This pinion is arranged to mesh with either of two bevel ring gears carried on a cross shaft and movable axially thereon. The bevel gear hubs have internal teeth that form a positive clutch and mesh with a spur pinion which in turn meshes with the spur gear that



Railcar fitted with two six-cylinder Continental bus engines and other automotive equipment by Oneida Manufacturing Co.



Left—External view of railway coach fitted by Oneida Manufacturing Co. with means for self-propulsion in either direction. Right—Motorman's compartment showing control elements which are duplicated at each end of car to enable double-end operation

drives the live axle. This arrangement permits of operation in either direction and gives a double reduction of 5 to 1, total. A torque arm is attached to the truck frame by means of a suitable spring mounting.

A flexible diaphragm mounted on each engine is connected at one side to the outlet of the water pump and at the other side to an air supply, the pressure of which is presumably controlled by the operator, either by a hand lever or a pedal. The diaphragm is apparently intended to serve as a water governor so designed that the limiting speed of the engine can be varied by varying the air pressure. Details as to the arrangement of this unit are not at present available, but it can be seen from the drawings that the diaphragm is inter-connected with the carbureter throttle.

Clutch Controlled Pneumatically

Gear shift and clutch are, as noted above, pneumatically controlled through the medium of a hand lever, but details of this arrangement are lacking also. Gear selection and engine start and stop control are also operated by a hand lever and are said to be interlocked in such a way as to render the control both positive and fool-proof. With this type of construction it is said to be practical to utilize not only two engines on the same car, but any number of cars so equipped as a train, and still maintain control from an individual station with a single operator.

Brake control is of the Westinghouse interurban type arranged for either automatic or hand operation. A 10-in. brake cylinder is connected in such a way as to operate brakes on four wheels of each truck.

It will be noted from the accompanying drawing that the unit power plants are mounted in cradles underneath the body of the car. These units are said to be arranged for quick removal and installation. The engine cooling system includes a Modine-Spirex double core radiator mounted on the roof of the car, and an 18-in. electric fan with thermostatic control. The pumps are of centrifugal type mounted on the engine. The cooling system has a capacity of 20 gal.

In addition to the foregoing units equipment includes a locomotive bell, Strombos diaphragm whistle, pilots front and rear, air operated sanders and speedometers at each control station. The engines are equipped with Bosch high tension magnetos, bus type starter with Bendix drive, Stromberg carbureters and U. S. centrifugal air cleaners. Weights of the various units are given as follows: Power unit only, 1420 lb. each, gear reduction 850 lb. each, generator set 510 lb., air compressor and tanks 620 lb., controls and piping 426 lb., pilots 250 lb.

The car is geared to make a maximum speed of 43.2 m.p.h. at the maximum engine speed of 2200 r.p.m. It is claimed that the equipment here described has met with the approval of the engineering and operating departments of various railways. Since the equipment consists of the assembly of practical and well-tried units, it is asserted that the car, as here described, does not depart in any way from principles which have been found practical in connection with steam and electric equipment.

In recent tests the car is reported to have been operated at a cost for gasoline and oil of 7.9 cents per mile and to have attained a speed of 48 m.p.h. on a 1 per cent grade. Starting on this grade, the speed is said to have been increased to 33 m.p.h. with 48 passengers. Two loaded box cars are said to have been readily switched in yards, using the railcar in place of an engine.

The weight of the car tested is given as 62,000 lb. and its length as 62 ft. 8 in. It has seating capacity for 60 passengers. Wheels are 33 in. in diameter and the journals measure 4½ by 8 in.

New Methods Developed for Handling Pickling Acids

THE manufacturing department of the Cadillac Motor Car Company has developed a method for handling powerful acids used in pickling steels to prevent rust.

These acids are received at the factory in carboys. According to usual factory practice, they are dumped by two men into the vats of boiling mixture.

The sudden breaking of a carboy of acid, either from the splashing of the boiling vat or from the slipping of fingers in an unguarded moment, is nearly akin to releasing liquid fire.

After a number of experiments, Cadillac safety engineers have developed a device by which the bottles are emptied while remaining on the floor. A tube is inserted into the bottle and attached to a stopper which has both an inlet and an outlet. Air is forced into the bottle under five pounds pressure. The acid flows through the outlet into a hose which carries it to the vat.

Increased Accidents Due to Speed Required in Modern Business

Traffic moves much faster and factories turn out products more quickly than generation ago. Automotive problems occupy prominent place on program at Twelfth Annual Safety Congress of National Safety Council. Highway congestion is discussed.

SAFETY problems which concern the automotive industry occupied an important part of the program of the Twelfth Annual Safety Congress of the National Safety Council held in Buffalo from Oct. 1 to 5. Vigorous steps were advocated to curb the increase of accidents due to the rapid growth of the use of automotive vehicles on the streets and the demand for high speed production in automotive plants. Papers of particular interest to the automotive field were presented not only to the special automotive section but at meetings of other sections whose activities brought them into contact with the automotive field. The automotive section meeting was presided over by E. F. Blank, safety director of the General Motors Corp., assisted by Theo. Meisner, district safety manager of the American Can Co., and L. E. Averill, safety engineer of the Oakland Motor Car Co.

Howard A. Coffin, assistant to the president of the Cadillac Motor Car Co., struck the keynote of the discussion in the automotive section when he contrasted the life of the business man in the time of his grandfather with that of the business man of our own period. He pointed out that the continual dashing about of the business man of today is characteristic of the entire industrial world. Greater speed demanded in the factories has greatly increased the danger of industrial accidents, just as the increased speed of traffic in the streets has greatly increased the danger of accidents to both pedestrians and drivers.

Accidents, he pointed out, are costly and, if only for this reason alone, they should be studied by the executives. The foreman cannot insist on safety if he is not backed up by the superintendent, and the latter in turn must be backed up by the higher executives. Coffin made it clear that in his opinion safety in the factory must come from the top down.

Traffic Regulation Discussed

Hon. Robbins B. Stoeckel, Commissioner of Motor Vehicles in the State of Connecticut, spoke on regulating motor vehicles and preventing accidents. Stoeckel said that the traffic problem of the United States, viewed from the safety angle, could only be glimpsed in its entirety when it is thought of in the same light as any other great problem which affects the health and welfare of all people. He likened it to an epidemic, which history and experience shows goes through several phases before it is conquered. First, there is a single case endangering a small number of individuals, a family perhaps of neighbors; then a group of cases endangering a community and finally a spreading, violent epidemic breaking out and destroying no one knows when and where. In the first phase no alarm is raised; in the second there is a little apprehension but no fear, but in the final phase people in numbers large enough to constitute a public become alarmed and apprehensive. The danger feeling spreads. Everyone worries and, as a result, the urge for a remedy comes and corrective forces are called into being and set to work.

This same process must be gone through with traffic dangers. The main elements entering into motor vehicle accidents are the personal equation, experience in driving, highway conditions, car equipment and some miscellaneous causes. Regarding the personal equation, Stoeckel said:

"The direct use of an automobile is an expression of the personality of a man or woman. If he or she possesses characteristics of consideration for others and of caution and care, these will be expressed in driving. Operation of a car is an expressed act of the mind. Therefore, the first qualification must necessarily be a good enough mind to drive.

Driving Experience Needed

"Granted a suitable mind and disposition, no man or woman can hope to become a driver without experience, but the degree of experience demanded as a *sine qua non* need not be great. It is self-evident that the danger point with a new driver will not come, mechanical control admitted, until he gets over being super-cautious—until he needs no longer to be careful about the coordination of his hand, foot and eye, and becomes self-confident. Experience is also needed to anticipate the action of other drivers. Nothing will so soon teach a driver what to expect as the unexpected.

"Now put a well-dispositioned and experienced man or woman into an automobile to drive along a highway, and at once the element of the physical characteristic of the road asserts itself. Every road has hundreds of traps which are all set. This is because it has never been and probably never will be possible to build an entirely safe road from a physical standpoint. The road building effort has been controlled by other than safety considerations.

"The element of car equipment enters into every hazard, but again in combination only. Brakes, springs, steering wheels, signals, must all on all occasions be serviceable enough to command approximate perfection in starting, running and stopping, but again the original quality of mind enters in. In short, a good mind with poor brakes is better than a poor mind with good brakes.

"Such is the traffic situation today. The giant of public opinion has been asleep, is now barely shaking off his coverlets. Soon he must arise in his might to fight and win the victory. What are the weapons he must have and how shall he use them? In the first place—law.

"Law is fundamental in the sense of being directed to

the root of things. To direct the personality of the driver there is needed a preventive law of selection for fitness by an examination before a driver is qualified. This means a law by which each driver is licensed by a State and so is qualified by and responsible to a State authority. Any United States legislation to accomplish this object would not provide the necessary intimate knowledge needed for control. It must be by small, intimate units, preferably by States. Such a license law, with power of suspension and revocation in a central State authority and properly exercised, will eventually cut out the improper mentality, punish the willful breaker of rules, and gradually bring order out of chaos. As an adjunct to such a law the examination for qualification must be strictly used. As a part of the licensing law and system, there must be rules for conduct, 'rules of the road' providing safe practices to follow as nearly as these can be prescribed. Willful breakers of such rules must be promptly and severely punished. All these rules relating to willful cases, such as driving while intoxicated, evasion of responsibility and continued cases of reckless driving, must carry qualification by loss of license. The discipline must be just; good-natured in corrective instances, severe in willful cases. The willful offender must be blotted out.

Law Enforcement Essential

"Proper law and discipline alone can reduce danger from accidents at least 50 per cent. But there is also the great weapon of education.

"Law and discipline through control of the person, helped by education and publicity, all welded together by public sentiment, will do the work. If a concrete general program for combat with highway dangers should at this time be laid out for use, it must include:

1—An adequate law fitted to the State where made, thoughtfully drafted, with consideration for the laws of other States having the same problems. Essential features of this law are a State operator's licensing system and a State statistical system, together providing proper and adequate control in a State authority.

2—State and city highway construction with especial study of and care applied to safety for both the pedestrian and the automobile driver. A safety engineer in each State highway control.

3—State and city supervision by adequate police, as widespread and well covered as possible, so that as much of the State and city traffic as may be will be directed traffic or supervised traffic.

4—A constructive plan of safety education beginning with a good safety text book and aided for years to come by the efforts of every safety organization and citizen through every available agency. As a part of this plan are the efforts of this Safety Congress; organized conferences of States; meetings of civic organizations; pictures, posters, publicity and every means at hand.

5—Public sentiment. Wake the giant up and make him work.

Coordinated Activity Urged

G. G. Kelcey, manager of the traffic engineering division of the American Gas Accumulator Co., presented a paper on the methods of study of traffic movement in relation to traffic accident prevention. Kelcey stated that traffic is an administrative and not just a departmental problem. Its treatment calls for the coordinated activity of almost all municipal departments. He suggested avenues of investigation to be studied by municipalities leading to the development of a plan of action to take advantage of existing opportunities with the least expense. Kelcey divided his paper in two parts, the first of which discussed traffic movement, and the second traffic accidents. He advocated the concentration of traffic through definite channels in order to simplify the problem of control and correspondingly reduce accidents. In concentrating traffic, his method is to block out on a large city map areas which are sources of or receive large volumes of traffic. Traffic flow is between such areas and into and out of a city.

In preparing a traffic map, the main traffic arteries are mapped out in color, with a second color used to indicate the heavily traveled secondary streets or connecting links. If the city is well planned, the map will show all areas adequately linked up by traffic channels which afford easy passage with the least interference. The third color should be utilized to map out desirable routings not at present available, but which can be used if improved.

Safeguard Punch Presses

A. L. Kaems, safety engineer of Simmons Company, Kenosha, Wis., gave an interesting talk to the automotive section about punch press safeguarding. He illustrated his points by a number of exhibits showing his method of introducing work to the dies without the operator's hand ever coming within the danger zone. He showed that in practically every instance it is possible, by allowing the piece to slide into place, not only to make the operation safe but to increase production. He was able to apply this method in some cases by turning the piece around so that it goes into the die from the side rather than from the top.

He stated that the secret of safety work on punch presses is not to attempt to make the punch press itself safe by the use of guards or other devices which tended to slow up production, but to take each individual piece as a separate problem and study out a method of introducing the work into the die without requiring the operator's hand to come within the danger zone.

M. P. Hanrehan, superintendent of the American Railway Express Co., Chicago, told how a delivery organization can reduce accidents. The American Railway Express Co. has adopted the slogan, "Everything is subordinate to safety." In his paper he pointed out the fact that pedestrians are inclined to take too many chances, which is responsible for a large share of the accidents. On the other hand, drivers disregard the rights of pedestrians. The express company requires from 3 to 6 mo. probation period before men are given drivers' or chauffeurs' positions. In handling men for this sort of work, it must be remembered that a driver may be full grown physically but only 10 yr. old mentally. A house organ known as the Express Messenger keeps the safety idea fresh in the minds of the operators at all times and the supervision of the driver and his instructions in safety are never allowed to lag.

A SERVO mechanism for brakes which embodies a new idea has been patented in England by G. S. Wilkinson and the firm of D. Napier & Son, Ltd. Two pistons working in suitable cylinders are connected to the rear and front brakes respectively. The discharge port of a gear-type pump, operated directly from the rear axle, connects to the cylinders. Ordinarily the oil entering the valve chamber on one side passes right on through a port on the opposite side, but this port can be closed by means of a valve actuated by means of the brake pedal. The oil pressure in the cylinders then rises and the brakes are applied. As the oil also presses against the valve, tending to open it, as soon as the brakes are on the valve will be forced slightly open and the oil pumped will pass through the cylinders. There is an extension on the valve which, if the oil should escape from the system, will abut against one of the pistons and thus apply the rear brakes.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE
Reg. U. S. Pat. Off.

PUBLISHED WEEKLY
Copyright 1923 by The Class Journal Co.
Vol. XLIX Thursday, October 11, 1923 No. 15

THE CLASS JOURNAL COMPANY
Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
David Beecroft, Directing Editor
U. P. C. Building, 239 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL
James Dalton, Editor
Norman G. Shidle, Managing Editor
P. M. Heldt, Engineering Editor
Herbert Chase, Engineering Editor

FIELD EDITORS
J. Edward Schipper W. L. Carver

BRANCH OFFICES
Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—317 Fort Street, West, Phone Main 1351
Cleveland—538-540 Guardian Bldg., Phone Main 6432
Philadelphia—1420-1422 Widener Bldg., Phone Locust 5189
Indianapolis—1212 Merchants Bank Bldg., Phone Circle 8426
Washington—26 Jackson Place, N. W.

Cable Address.....Autoland, New York
Long Distance Telephone.....PENnsylvania 0080, New York

United States and Mexico.....One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law 0.50
Canada .....One Year, 5.00
Foreign Countries .....One Year, 6.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.
Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.
Member of Associated Business Papers, Inc.
Member of the Audit Bureau of Circulations.
Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Headlamp Adjustment Charts Needed

SIMPLE, complete instruction cards regarding headlamp adjustment, if placed in the hands of dealers by manufacturers, will help greatly to reduce the prevalence of headlamp glare. Proper adjustment of headlamps is not a complicated job for any garage and repairshop worker, provided he has at hand an instruction chart for the particular make of car on which he is working. Several important manufacturers have already prepared such a chart and have given it wide distribution, both among their own dealers and among other garages and repairshops where lamp adjustments are likely to be made.

These charts have helped to insure proper headlight adjustment on new cars sold by the various dealers and, by making it easy for the dealer to do such work, have increased the number of vehicles operating with their lights in correct focus. Such an adjustment chart should be available for every make of car, and dealers should be encouraged to make practical use of them as often as possible.

Through instruction charts and through dealers the automotive manufacturer can aid materially the work of keeping headlamps in adjustment.

Fabric-Leather Bodies Prove Serviceable

ADVICE from our Paris correspondent to the effect that several British passenger car manufacturers, including such well known makers as Daimler, Talbot, Sunbeam and Rover, have adopted the Weymann system of light weight fabric-leather construction for closed bodies described in these columns on April 5, 1923, raises the question as to whether the possibilities of this general type of body are being given sufficient consideration by American body builders.

We are advised that the Meritas body exhibited in New York at the time of the automobile show last January has since seen over 15,000 miles of service. Painted and enameled parts of the chassis and hood are reported to have become dull, but the fabric is said to have the same luster as when first applied, while even the fabric-leather fenders are still in excellent condition.

The American product differs from the French Weymann design chiefly in respect to the frame construction.

In the Weymann body the frame is much lighter than in any other type of construction with which we are familiar and is purposely made quite flexible. Practically all frame members measure 1½ in. square section. All joints are made by metal plates bolted through the wood. All parts are so arranged that there is quite a space between wood members and in no case does wood touch wood. This is done to preclude rattles. No longitudinal sills are employed and the seats and floorboards rest directly on the chassis frame, so that the body, which is entirely independent of them, is required to support only its own weight. Fabric leather is stretched directly over the wood panels without padding except at the cowl. Special provision is made for keeping door joints tight and still preventing rattle.

In the Meritas body a wire mesh is tacked to a rabbeted portion of the frame to form a base for the two layers of cotton wadding over which the fabric-leather is stretched after a sheet of 12 oz. duck is tacked in place. The latter has been substituted for the buckram formerly employed because the buckram has exhibited a tendency to buckle when moisture is absorbed, as it is when the fabric-leather has to be wet in stretching over a rounded surface.

It appears that the fabric-leather body possesses notable advantages in respect to weight saving, practical elimination of body painting, durability even under adverse conditions, such as mud and alkali dust, and ease of repair in case of damage in service. If it can be made as cheaply as other forms, and there is evidence that it can be, at least in comparison with certain of the higher grade jobs, it should enjoy considerable popularity, for it is attractive in appearance and has received favorable comment in this regard wherever shown.

Danger Lies in Over-Production and Over-Expansion

SALES of motor cars are flattening out in many sections of the country and used cars are piling up. The situation is not alarming, however, and business probably is better than it ever was before at this time of year. The only danger is that some companies will take the position that "there ain't no such animal" as lessened demand for their particular products. If they do, they may find it necessary to force cars on their dealers or store them in warehouses. Either expedient is likely to prove expensive, for dealers are much more independent than they once were. They will permit themselves to be pushed so far and no farther. Both of these processes are going on now to a certain extent.

As AUTOMOTIVE INDUSTRIES pointed out recently, the chief factor of doubt is not how many automobiles the American people can afford to buy but how many they want to buy. It should not be forgotten that they have absorbed nearly 5,700,000 motor vehicles in the past 21 months, which is as many as they bought in any previous three years. This has meant an average of about 270,000 month in and month out. The average for the last nine months has been 347,000. It was 20,000 less than that in July, 3000 less in August and 19,000 less in September. The highest monthly average for any preceding year was 221,000 in 1922.

Nobody ever has been able to determine what is normal in this business. It may be something like 347,000 a month when general business conditions are as good as they are today, but we doubt it. That would be at the rate of 4,164,000 a year, and it remains to be seen whether even 1923 will be a "four million" year. To reach that figure the industry must make 872,000 units in the next quarter, an average of 290,000 a month. The last quarter of 1922 showed an output of 728,000.

The chief virtue of these figures is to show that it is not surprising business is falling off. It would be more surprising if it weren't. It can fall off a lot more before it can fairly be described as poor. No matter what happens in the next three months, the industry will have had a marvelous year. If it suspended operations entirely for the next three months it still would have had the biggest year in all its history.

The bottom isn't going to drop out, however. All propaganda to the contrary notwithstanding, general business conditions are good and there is no apparent reason for assuming they won't continue to be. Until they get very much worse than they are now or are likely to be, a great many automobiles will be sold. No one kicked much about business in September last year and production in that month was nearly 122,000 less than it was last month. It could slip 99,000 this month and still be as good as it was last October, when sales were so heavy everybody was excited about them.

All of which applies, obviously, to the industry as a whole and not to individual companies. The greater the decline in sales volume the fiercer will be the battle for what business remains.

Complaints have been heard in some quarters that recent price reductions are uneconomic and that they have tended to demoralize the market. No price reduction ever is uneconomic if it will increase sales, thereby lowering production costs, and still leave a fair margin of profit. None of the reductions made recently has been sharp enough to indicate that the maker was sacrificing all his profits. Nor have they been large enough to demoralize the market.

As a matter of fact, the present unassailable position of the industry is due chiefly to the fact that it has treated the public fairly ever since the collapse of 1920 by giving the best values possible, by striving constantly to turn out better products and by keeping manufacturing efficiency at a high level.

Business will be good for the next quarter, although not as good as it was in the earlier months of the year, and the lion's share will go to those the public regards as most deserving of patronage.

Going a step farther, business promises to be good in 1924, but there is no reason to believe it will be better than in 1923, and expansion plans, save in a very few cases, will be ill-advised. Uneconomic expansion is devastating alike to profits and future prospects.

Move Made in Spring Tire Dating

Rubber Association Would Alter Practice

Executive Committee Recommends Changes to Improve Dealer Sales Conditions

NEW YORK, Oct. 9—Five recommendations for revision of the spring dating practice are made by the executive committee of the Rubber Association of America in a letter addressed to members and dated Oct. 2. The recommendations advocate the following revisions:

Restriction of spring dating orders to the period between Oct. 15 and Feb. 28.

Solicitation of but one spring dating order from each customer to prevent overloading of dealers.

Continuation of the present protection against price cuts on spring dating business up to May 15.

Efforts to get business from city dealers on short terms.

Application of spring dating terms in accordance with a zoning system.

Adoption of these policies by leading tire manufacturers would mark a definite step toward revision of marketing practices along constructive lines. Most of the recommendations are directly concerned with making sales conditions better for dealers.

Favor Dropping Practice

Some individual members of the association believe that the recommendations do not go far enough and that spring dating should be abolished entirely; but practically all of them seem to agree that the policies advocated by the executive committee constitute a definite step in the right direction.

There is a feeling in some parts of the industry that these recommendations mark the first move toward elimination of spring dating at some time in the future, although nothing in the letter of the executive committee points definitely to such a conclusion.

While it is generally agreed that widespread adoption of these policies would be for the good of the industry, certain executives when asked for their opinion, emphasize the fact that the value of the recommendations depends largely upon how fully they are carried out by all of the important tire companies.

Particularly does this apply to the attempt to get business on short terms for city dealers. The executive committee points out that "on account of the ample and constant service available to dealers in cities, also because of public demand during the fall and winter season being little below the summer period, every effort should be made to solicit business on much shorter terms than are extended in any other territory."

Tire executives believe that the reasoning behind this recommendation is thoroughly sound, but point out that the policy will have to be carried out fully by every important tire organization if it is to be effective.

Some slight opposition to the zoning system exists, a few companies feeling

(*Continued on page* 769)

Business in Brief

NEW YORK, Oct. 10—Summing up the situation this week, it is found that buying generally exceeds that of a year ago, with business men showing caution and conservatism in their purchases because of price uncertainty.

Wearing apparel, including jewelry, is going strong. Grains and live stock show the greatest strength, with weakness in iron and petroleum. The jobbing trade is most optimistic and reporting extra good business in the South because of the high prices obtaining for cotton.

Iron and steel and petroleum and their subsidiaries report less activity than usual at this time of the year, with pig iron and scrap lower, as is bituminous coal and coke. Finished steel is unchanged, although railroads are reported to be taking quantities of rails. Lumber reports are better.

Weather conditions in the West have been against the crops, and private estimates on corn range from 2,982,000,000 to 2,992,000,000 bushels, as compared with last month's Government report of 3,076,000,000 and 2,891,000,000 bushels harvested last year. Grain movements are reported the lightest at this time in many years.

There was a decrease in car loadings, the total of 1,060,436 for the week ended Sept. 22, being a drop of 30,000 from the previous peak. This can be accounted for by the strike in the anthracite field. Compared with the same week a year ago, it was an increase of 99,298 cars.

Industry Producing in Conservative Way

Output for Month Will Be Well Ahead of Total in October of Last Year

NEW YORK, Oct. 8—Automobile producing plants are proceeding at a steady, conservative pace, with schedules higher than last year and based directly on actual retail demand. From early indications the month's output will be well ahead of the total reported for October, 1922. Some falling off from the August total of 328,000 cars and trucks is to be expected, but the percentage of difference between these months this year is not likely to be as great as that of a year ago.

With the exception of a few plants, in which factory readjustments will take place toward the latter part of the month, the general easing in production will not be exceptional or especially marked. The majority of producers show an unwillingness to stock dealers beyond current needs and there are reports from some districts of the country showing a present shortage of cars, chiefly of the closed type. This is true, particularly, of companies bringing out new models.

Sales Demand Healthy

Sales demand continues healthy, with only a normal dropping off being experienced. New models are attracting a great deal of interest, which is being reflected in factory orders. Price reductions also have proved a stimulus to sales, accentuated by more or less intensive selling on the part of dealers and by a more general movement toward the holding of shows.

The recent reductions made by Ford are regarded as having a stabilizing effect on the price situation, and the announcement that no change in lists of the Lincoln car, owned by Ford, sets at rest rumors of a likely cut that will react favorably on the sale of other cars in the same price class.

The report of members of the Motor and Accessory Manufacturers' Association for August gives an in-

(*Continued on page* 768)

Company Formed for Truck Merger

Bessemer President Heads Organization

American Motors and Bessemer American Now in It and Winther May Enter

NEW YORK, Oct. 9—The Amalgamated Motors Corp. has been formed with $1,000,000 capital stock and will bring about a merger of several truck companies and one passenger-car builder.

Details of the merger are not ready for announcement at this time but it is expected that plans will have matured by the end of the week so it will be possible to announce the make-up of the new corporation.

At the head of affairs is P. W. Hansl, president of the Bessemer-American Motors Corp. and vice-president of American Motors of Plainfield, N. J., the former concern controlling the production of both the American passenger car and the Bessemer truck.

Both of these companies will be in the merger and it is said that a third one will be Winther Motors, Inc. of Kenosha, Wis., which was sold at trustee's sale to a creditors' committee last week. It is reported that Hansl and his associates figured largely in this transfer of interests, with the intention of bringing Winther into the merger.

No other names are mentioned in the deal so far but it is reported that several other truck concerns are to be brought together into this consolidation of interests.

New Winther Company Formed

KENOSHA, Wis., Oct. 8. — The Winther Motor Co. is the name selected for the new corporation which has been organized by the group of stockholders in the defunct Winther Motors, Inc., Kenosha, Wis., who purchased the plant and most other assets at trustee's sale recently.

Articles of incorporation have been filed in Wisconsin, which give the authorized capital at $500,000. Arrangements are being made to resume operation at once. Enough business has been guaranteed and more is in immediate prospect, it is stated to keep the factory business at capacity for the greater part of six months.

SHALER EXPORT CO. FORMED

WAUPUN, Wis., Oct. 8—Shaler Export Co. is a new Wisconsin corporation organized with a capital consisting of 500 common shares without par value, to handle the export sales and other business of the C. A. Shaler Co. of Waupun.

E. S. EVANS AT SOUTH BEND

DETROIT, Oct. 10—E. S. Evans Co., Inc., established this month a factory for the manufacture of export boxes in South Bend to serve the Studebaker Corp. and other shippers in the South Bend and Chicago districts. The factory has a capacity of 100 boxes a day. The boxes to be built are of the new Evans design.

Standard Car Producers Are Not Carrying Any Stocks Into the Approaching Winter Period

AN INTERVIEW WITH LLOYD P. JONES,
President of the Federal Bearing & Bushing Co.

By D. M. McDonald,
Detroit News Representative of the Class Journal Co.

Detroit, Oct. 10.

THAT there is no feeling of pessimism in the industry over prospects for business in the coming year is amply evidenced by inquiries on parts sent out by manufacturers in leading lines, declared Lloyd P. Jones, president of the Federal Bearing & Bushing Co., in a talk this week.

On the contrary, there is every evidence that manufacturers are looking to a better year in 1924, presidential year notwithstanding, than they had this year, and are outlining their requirements for parts and material on this basis.

It is true the industry has passed the stage where it is placing orders far in advance of actual manufacturing requirement, Mr. Jones said, and that there is nothing definite about the preliminary buying movements, but the fact remains that manufacturers are prospectively larger buyers from parts and material sources in the coming year than in any previous year to date.

Slowing down in business in the latter part of the year is only typical of the industry, Mr. Jones said, and is nothing more serious than that. For all of its existence the industry has experienced alternately heavy and slow buying movements, the present season with its slackening down after a heavy rush in the early part of the year only being a repetition of past history.

With its experience the industry now has coordinated its buying, manufacturing and selling effort so that it is in a position to control its operations according to the market. This is amply borne out by present operations which find manufacturers going along at a steady conservative pace, with no inventories or commitments to affect their manufacturing plans.

There is hardly any doubt but that the industry will always be subject to influences which will make steady all-year operation at a fixed rate impossible, and for that reason not only car manufacturers but parts and material makers must perfect their manufacturing facilities so that they will be able to take advantage of market conditions when at peak, and not carry high overheads of equipment and tools when business is slow.

One of the heavy sources of loss to the industry in the past, Mr. Jones said, has been the expansion of plants and equipment, when business was in peak periods, with the consequent heavy carrying costs in the dull periods. To overcome this manufacturers must study their present plants, investigate the possibilities of improved tools and equipment, better production methods with present equipment.

None of the standard car manufacturers are carrying any stocks into the winter period, Mr. Jones said, which is most encouraging to the parts maker, but at the same time it charges him with the responsibility of meeting practically over-night orders or increases at any time. To some extent it is likely that this burden of meeting sudden increases in orders will be mitigated by the generally optimistic feeling among manufacturers.

Commercial Truck Maker Separated from Dolling

PHILADELPHIA, Oct. 9—By a decision of Judge Dickinson in the District Court, the Commercial Truck Co. and the Commercial Truck Service Co., both subsidiaries of the R. L. Dolling Co., have been separated from the parent concern.

J. Howard Patterson, receiver for the American Bronze Co., another Dollings subsidiary, reported that the company had earned $7,000 in September, which profit stands against a deficit before the receivership, Patterson said.

Men from Industry Meet with Coolidge

Advisory Committee from N. A. C. C. Later Confer with Secretary Hoover

WASHINGTON, Oct. 8—Four directors of the National Automobile Chamber of Commerce, appointed by the Chamber as an advisory committee to the Department of Commerce, called on President Coolidge Friday morning. Later they met with Secretary Hoover to discuss plans for a Pan-American road conference in this country next spring.

The committee consists of Roy D. Chapin, Hudson-Essex, chairman; John N. Willys, Willys-Overland; A. H. Swayne, General Motors, and A. R. Erskine, Studebaker and W. O. Rutherford, president of both the Motor and Accessory Manufacturers' Association and the Rubber Association, who was added to represent parts and tires on the committee.

The visit to the President was scheduled in order that he might learn more about the automotive industry, and be given assurances that the automotive industry recognizes the public responsibilities thrust upon them by the growing legion of motor car users; also to show that they are ready to cooperate with the Government and other agencies in the solution of America's transportation problem.

They found the President a good listener and at the same time that he was fully alive to all phases of the transportation problem. President Coolidge listened attentively as Chapin told of the rapidity with which motor car use has extended, swelling from 1,000,000 to 13,000,000 in a decade, which necessarily has brought with it new and difficult problems.

"The motor car," Chapin said, "is effecting vast changes in all of our plans in this country, and we who manufacture the car feel that it is our duty to cooperate with the Government in every way possible."

Continuing, he said:

Full Cooperation in Past

The Department of Commerce has had our full cooperation in the export field upon the development of which depends the employment of many men in this country. In addition we have joined whole heartedly in the research work which is paving the way for cheaper fuels and even better engines than we have today, and we are prepared to do our part in movements looking toward elimination of waste, scaling down of unemployment peaks and those other broad business problems which the department is working on.

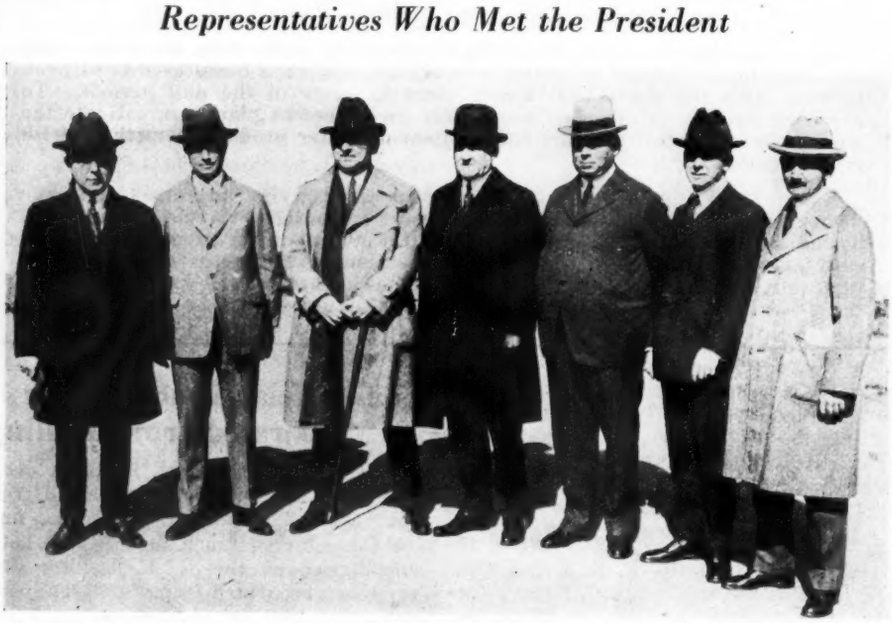
Another field where we have been able to be of some service has been the Department of Agriculture. The studies being made by that department into marketing costs, effect of highway transport upon the living costs and standards of farm life, and in fact into the whole rural problem, are fundamental in our judgment.

The work of the Bureau of Public Roads is of vital importance. The construction of highways adds immensely to the capital wealth of the nation and their maintenance not only lowers the cost of transport over them but adds immeasurably both to social and economic advantages.

The research work which is being done by the Bureau into the various effects of highway traffic is developing basic information of great public value, and there can

(*Continued on page* 765)

Representatives Who Met the President



President Coolidge listened to the voice of the automobile industry last week through the medium of the advisory committee to the Department of Commerce, which was appointed by the National Automobile Chamber of Commerce from among its directors. Those who called at the White House, reading from left to right, were: John N. Willys, Roy D. Chapin, A. R. Erskine, W. O. Rutherford, A. H. Swayne, J. Walter Drake and Alfred Reeves

R. M. Owen Syndicate Gets Stevens-Duryea

Court Authorizes Sales for $450,000—New Owners Will Organize Company

SPRINGFIELD, MASS., Oct. 8—Sale of the plant and assets of Stevens-Duryea, Inc., to a syndicate headed by Ray M. Owen, president of the Owen Dyneto Co. of Syracuse, and including Roy Rainey, a steel and coke man, and R. W. Stanley of the Stevens-Duryea company for $450,000, was today authorized by Judge Richard W. Irwin of the Superior Court.

This action was taken following a continued hearing by the court at Northampton Oct. 6, when it appeared that no substantial headway had been made on a plan by a group of minority stockholders to take over the plant.

The new owners have not fully completed their plans, but they will continue the manufacture of Stevens-Duryea cars as soon as they take possession of the plant.

Will Continue Car

The receivership, which lasted fourteen months, did not stop factory operations, for during that time the receivers manufactured and sold 116 new cars and disposed of ninety-two reconditioned cars, which netted a total of $864,000.

A new company will be formed at once by Owen.

The plant, which was completed the first half of 1920, covers 100,000 sq ft. and is located on thirty-one acres of land. It has a capacity of 2000 cars a year, and the new buildings erected in 1920 cost $950,000.

Production Started in 1906

The Stevens-Duryea has been before the American public since May, 1906, when the Stevens-Duryea Co., a Massachusetts company, was organized, building what is claimed to have been the first American six-cylinder automobile as designed by J. Frank Duryea, brother of the pioneer Charles E. Duryea. The original company continued operations up to 1915, when it sold its plant and part of the equipment to the New England Westinghouse Co., which made use of the plant for war work. On Nov. 19, 1919, following the declaration of peace, Stevens-Duryea, Inc., was organized and the manufacture of automobiles resumed. The company's personnel included: R. S. Doering, president; G. M. Berry, vice-president and generai manager; M. R. Leathers, secretary and treasurer, and P. W. Hine, sales manager.

The company went into a receivership May 9, 1922, as the result of a bill in equity filed in the Superior Court by the Fisk Rubber Co. of Chicopee Falls. Harry G. Fisk of Chicopee Falls and Frank H. Shaw of Chicago the latter representing the banking creditors, were named as receivers.

Engine Valves Form S.A.E. Discussion

Detroit Section Hears O. D. Heavenrich, Eugene Bournonville and Rollin Abell

DETROIT, Oct. 10—In line with the slogan for the season of 1923-24, "Building cars for service and not for service stations," the first engineering session of the Detroit Section of the Society of Automotive Engineers was devoted to the consideration of rotary and disc valve engines.

Papers were presented by O. D. Heavenrich of the Guy Disc Valve Motor Corp., Eugene Bournonville of the Bournonville Rotary Valve Motor Co. and Rollin Abell of the Single Valve Engine Co. Due to the absence of representation of the sleeve valve manufacturers, this construction was not given the attention that was anticipated.

Guy Engine Valves

Slotted cast iron disc valves are used in the Guy engine, each cylinder being fitted with a single valve which seats on the flat cylinder head. Four equally placed radial slots engage with alternate intake and exhaust ports which communicate with the respective manifolds. The valves are driven by vertical shafts passing up through the cylinder head, being driven by gears at the upper end which form a train across the top of the engine.

The valve discs are mounted freely on the individual shafts and are driven by keys. This construction relieves the valve disc of the effects of any misalignment of the drive shaft and permits accurate seating at the surface of the cylinder head.

The gears at the upper ends of the valve drive shafts are driven from the crankshaft through the medium of a vertical shaft with a gear at its upper end, which is in turn driven from the accessory shaft and is located in the vertical plane of the middle main bearing. As the valve discs are formed with four slots, this shaft as well as the valve drive shafts rotate at ⅛ crankshaft speed.

Rotary Valve in Bournonville

In the Bournonville engine a rotary cylinder valve which is located above the cylinder barrels extends throughout the length of the engine. As three port depressions are formed for each cylinder, this valve barrel is driven at 1/6 crankshaft speed by a vertical shaft at the front end. Expansion of the valve barrel is minimized by passing the intake stream through its interior and by a novel spring actuated wedge and shoe arrangement which keeps the barrel in contact with the lips of the port openings through a light intermediate oil film at the same time allowing for any variation in size.

As the valve barrel is made of thick sections and each port depression and opening is swept by alternate intake and exhaust streams, the effects of temperature are reduced to a minimum.

Although a rotary transfer valve is used in the Abell engine, the pressure of compression and explosion is sealed by a large positively controlled poppet valve which is located at an angle in the cylinder head and conforms to its hemispherical characteristics. This valve is operated by a single overhead camshaft, the cams of which operate in double roller type of yokes on the constant diameter principle.

No Valve Springs in Abell

No valve springs are used as the outer ends of the yokes engage with the valve stem through a two-flanged spool which forms the clearance adjustment. The positive action returns the valve close to the seat and sealing is obtained by the pressure within the cylinder. The valve opens at the usual exhaust opening point and remains open until the intake closing point.

The single port is alternately registered with the intake and exhaust passages by the cylindrical transfer valve, the transfer depressions being swept by alternate cool and hot streams and therefore requiring no particular refinement of design for sealing or thermal demands.

Both camshaft and distributor valve are driven at half speed by a gear train at the front end of the engine. This engine has been built with unusually high compression ratios and operates successfully with a ratio of 8:1. Much

(*Continued on page* 764)

BALLOON TIRES NOW BEING MADE BY 21 PRODUCERS WITH SIZE USED ON TAXICABS PREDOMINATING

New York, Oct. 8.—Twenty-one tire companies are now manufacturing balloon tires, according to a compilation made by the Tire Rate Book, published by the Class Journal Co.

Eight different sizes are listed, the 29 x 4½ which is used on taxicabs, predominating. The following table gives the sizes and the companies manufacturing them:

28 x 4	30 x 5 (Cont.)	34 x 7
Goodrich	Goodrich	Armstrong
Hewitt	Goodyear	Brunswick
Miller	Hewitt	Firestone
29 x 4½	Horseshoe	Fisk
Ajax	Michelin	General
Brunswick	Miller	Goodrich
Corduroy	Pennsylvania	Goodyear
Empire	Superior	Miller
Firestone	United States	Mohawk
Fisk	Vitalic	**36 x 8**
General	**32 x 6**	Armstrong
Goodyear	Armstrong	Firestone
Hewitt	Brunswick	Fisk
Horseshoe	Firestone	General
Michelin	Fisk	Goodrich
Miller	General	Goodyear
Pennsylvania	Goodrich	Miller
Racine	Goodyear	**38 x 9**
United States	Hewitt	Goodyear
30 x 5	India	Miller
Firestone	Miller	**40 x 10**
Fisk	Pennsylvania	Goodyear
General	Superior	

Salesmen Best Buyers of Paige-Jewett Cars

DETROIT, Oct. 11—The monthly compilation of sales of the Paige Motor Car Co. shows that salesmen bought more Paige and Jewett cars in September than did any other buyer classification. Next in purchases were members of labor classes, with the exception of building trades.

The showing of salesmen purchases, H. M. Jewett, president, says, is an indication that general business is good. Salesmen are earning money and that means their business houses are prospering. This is further borne out by the extent to which wage earners in practically all classes are buying.

The classifications of sales in the month were:

Salesmen	10.6
Mechanics	10.5
Executive, mfrs.	10.2
Grocery and meats	9.4
Building trades	8.
Miscellaneous	7.3
Work not given	6.8
Real estate, ins.	6.6
Women	6.4
Farmers	3.6
Merchants	3.4
Garage	2.8
Retired	2.2
Physicians	2.
Government	1.8
Hotel, restaurant	1.6
Railroad employees	1.4
Bankers, brokers	1.2
Office workers	1.
Engineers	1.
Lawyers	1.
Taxi chauffeurs	.6
Drugs	.6

New Bus Types Shown at Traction Exhibit

Important Developments Made, Chiefly in Special Chassis —Bodies Displayed

ATLANTIC CITY, N. J., Oct. 8—Several new and important developments in the art of bus building are being shown here this week at the annual convention of the American Electric Railway Association. Automotive displays occupy about 30 per cent of the space on the big steel pier devoted to exhibits designed to appeal to traction companies.

It is significant of the dawn of a new era in electric railway thought that more interest is being manifested in buses than in anything else. It is much more than idle curiosity, for many of the men who are carefully inspecting the exhibits are coming into the market to buy. They now are gathering the data upon which they will base their decisions. The number of buses operated by street railway companies probably will double within the next year, for the surface of this market scarcely has been scratched.

Few Makers Aggressive

Most truck manufacturers realize dimly that the future will bring big bus sales, but apparently only a few of them have gone aggressively after this rapidly developing street railway business. Among those displaying one or more models here are: White, Mack, Fageol, Garford, Fifth Avenue Coach, Yellow Coach, Federal, Pierce-Arrow, Graham Bros., Reo, Acme and International Harvester.

Some of the makers have at last designed special bus chassis, and it is chiefly in these that new ideas are to be found. Very few make any of the bodies with which their chassis are fitted, and there are at least fifty-seven varieties of bodies.

Considerable discussion was heard of the need for standardizing on a comparatively few body types. This would reduce production costs, and price is an important element in dealing with public utility corporations in these days. They are concerned chiefly with reliability, efficiency, low operating costs and the number of passengers the vehicle will carry. More attention is being given, however, to the comfort of passengers.

Buses Have Looked Like Trolleys

One rather surprising point in connection with buses up to the present time is that all of them, except the deluxe bodies, look much more like street cars than they do automobiles.

Six-cylinder engines, front wheel brakes and air-operated brakes have made their first appearance on prominent makes of bus chassis. Nearly all chassis shown are designed especially for bus service, with low frames and various means for improving riding qualities as predominating features.

Pierce-Arrow has an entirely new bus chassis incorporating a dual valve six-cylinder engine, resembling the passenger car engine of the same make in general design. Low frame, long springs and propeller shaft brakes are features of this job.

White model 51A has eliminated propeller shaft brake, increased weight and bearing dimensions of the rear axle, replaced fabric with Spicer universals, installed new steering wheel and made other alterations of minor character.

Fageol exhibits a safety coach with both four and six-cylinder engines, very low frame, aluminum cowl, full-floating Timken underslung worm axle, Gruss air springs in front, Michelin disc wheels. Westinghouse air brakes with metal to metal shoes are furnished as extra equipment.

Exhibit of Federal Truck

Federal Truck Co. shows a new bus chassis with a six-cylinder Continental engine, low frame without kickup, Remy 30-ampere generator driven off the transmission, Timken underslung worm axle with two sets of internal brakes and Michelin disc wheels.

Fifth Avenue Coach exhibits a new sixty-one-passenger double decker similar to the older fifty-one-passenger model, but incorporating larger counterbalanced crankshaft in a Yellow Knight engine, three-piece cranked internal gear axle with steel band brakes, double contracting brake on propeller shaft and other refinements. Removable glass enclosure for upper deck is provided as extra equipment. Single deck F.A.C. refinements include heavier frames, special Timken underslung axle and same engine changes as in double decker.

Garford has the same special bus chassis as was shown in Chicago last year, but incorporates minor changes, such as larger generator, aluminum radiator shell, Budd disc wheels, with deluxe bodies only. Westinghouse air brakes are applied as extra equipment.

Yellow Coach shows a new bus chassis with front wheel brakes and rigid frame as recently described in AUTOMOTIVE INDUSTRIES.

Mack Showing New Model

Mack is showing outside its booth exhibit a new model A B twenty-five-passenger bus with lower frame, drop front axle, underslung front spring, overgeared transmission, slightly modified rear axle and front bumper supported on rubber goose-necks. This chassis is not in production, but is expected to be ready for market in about six months.

The International Harvester Co. displayed a new bus model which in some respects is hardly out of the experimental stage. This has a 4½ x 5 in. four-cylinder engine, 190 in. wheelbase and internal gear rear axle. Brakes are fitted on all four wheels, and all of these are air operated. They are expanding type, those on the front wheels being a modified Shuler design. Front brakes are applied with less pressure than rear. In most other respects this bus follows conventional practice.

G. M. C. to Establish Plant in Copenhagen

Chevrolets Will Be Marketed from It Through Various Parts of Europe

NEW YORK, Oct. 9—Chevrolet cars will be assembled in Denmark and stocks of parts carried through the formation of General Motors A/S by the General Motors Corp. Headquarters will be located in Copenhagen, and the new organization will market the cars in Norway, Sweden, Denmark, Finland, Poland, Esthonia, Latvia, Lithuania, Russia, Germany, Austria, Hungary, Czecho-Slovakia and ultimately in Holland, it is announced.

The plant has been established in the South harbor district of Copenhagen, and the operation will be under the direction of James D. Mooney, vice-president of the General Motors Corp. in charge of export matters. H. G. Zimmerman, Copenhagen branch manager of the General Motors Export Co., will be in charge of the new organization.

The establishment of this assembly plant is in line with the policy of General Motors announced some time ago to expand the distribution of its products in overseas markets as rapidly as economic conditions justify.

Stockholders of Dorris Hear Two Propositions

ST. LOUIS, Oct. 8—There were two propositions put before the meeting of the stockholders of the Dorris Motor Car Co., held here Oct. 5. One provided for the refinancing of the organization and the other for an outright purchase by outside parties. An adjournment was taken until Nov. 2 to give the stockholders a chance to think the matter over and to await further developments.

No action was taken with regard to the proposed merger with the Haynes and Winton companies.

Temporary Receivership of Mercer Terminated

NEWARK, N. J., Oct. 8—The temporary receivership of the Mercer Motors Co. of Trenton has terminated, and W. A. Smith, one of the receivers, has been appointed trustee.

Smith also has been named general manager of the Newark-Flint Co., distributor of Flint, Locomobile and Princeton cars for New Jersey.

CYCLE SHOW IN FEBRUARY

CHICAGO, Oct. 10—The tenth annual National Motorcycle, Bicycle and Accessory Show will be held in Chicago Feb. 4 to 9 at the Broadway Armory, under the auspices of the Motorcycle and Allied Trades Association, of which A. B. Coffman is secretary.

Men of the Industry and What They Are Doing

Harper to Enter Own Business

H. B. Harper has resigned as sales manager of the Studebaker Corp. to enter business for himself. He is returning to Philadelphia, where he formerly was head of the Harper Overland Co., Willys-Knight distributor, to complete his plans. For the present no successor will be appointed H. A. Biggs, vice-president, continuing, as heretofore, in full charge of sales.

Harper first engaged in the automobile business on the manufacturing side as advertising manager for the Ford Motor Co. in 1906. After holding other important positions with Ford, he joined Willys-Overland, holding several posts until he became sales manager, leaving that position to take over the Willys-Overland distributorship in Philadelphia. Within two years his company became the largest distributor of Overland and Willys-Knight cars in the world, and the position was maintained up to the time that the Willys-Overland policy was changed, replacing a number of distributing accounts with factory branches. From the Philadelphia distributorship, he went to Studebaker where during his incumbency the annual sales of cars rose from 67,000 to 150,000.

Miss Storm Is Selden Ad Head

Miss Evelyn V. Storm has been appointed head of the advertising department of the Selden Truck Corp., Rochester, N. Y., an announcement to that effect being made by Hal T. Boulden, vice-president of the corporation. Miss Storm is believed to be the only woman in the country occupying such a position in the automobile industry. She has been with Selden for the last fifteen years and before her recent appointment was in charge of sales promotion work.

Schaeffer with Roamer

I. H. Schaeffer, who has been secretary of the Premier Motors Corp. for some years, has resigned to take up new duties as vice-president of the Roamer Motor Car Co.

Hudson Advances James

W. A. James has been promoted to assistant sales manager of the Hudson Motor Car Co., having been advertising manager for the last few years. He will continue to supervise the activities of the advertising department.

G. D. Harris Resigns

G. D. Harris, identified with the Wisconsin Automotive Corp. of Menasha, Wis., formerly known as the U. S. Tractor & Machinery Co., for the last five years in capacities from secretary to vice-president and general manager, has severed his connection with that concern. He has made no plans for the future, but inasmuch as he has been associated with automotive lines for more than twenty years it is likely he will continue in that field of endeavor.

Miller Rubber Promotes Propst

Wallace E. Propst has been advanced to the post of assistant sales manager at the Miller Rubber Co., Akron, Ohio. Propst formerly served as manager of the Burlington, Iowa, branch of the B. F. Goodrich company but for the last three years has been manager of the Milwaukee branch office of the Miller company.

Frick Connected with Duratex

E. M. Frick, formerly connected with the sales and advertising department of the O'Bannon Co., is now connected in a similar capacity with the Duratex Corp.

Malotte Represents Lavine Gear

Walter L. Malotte has been appointed representative in Detroit of the Lavine Gear Co. of Milwaukee, with his offices at 4829 Woodward Avenue.

Judge is Manufacturers Agent

James C. Judge has returned to Detroit and opened an office at 4855 Woodward Avenue from where he will operate as a manufacturers' agent. For the last six years he has been in charge of sales in New York, New England and eastern Canada for the Hércules Corp. of Evansville, Ind.

Hanson Joins Cream City Foundry

Palmer E. Hanson, formerly superintendent of one of the foundries of the Lakey Foundry & Machine Co., Muskegon, Mich., has become superintendent of the Cream City Foundry Co., Milwaukee.

Roemer Assists Multibestos Sales

A. J. Roemer has been appointed assistant sales manager of the Multibestos Co. of Walpole, Mass.

SHIPBUILDER MAKES WHEEL

DETROIT, Oct. 10—The Newport News Shipbuilding & Dry Dock Co. has entered the automotive field and will manufacture the Flex-sil-ient steel wheel, which is on display this week at Detroit's closed car show. Its feature is a new shock absorption principle. The wheel will be manufactured at Newport News, Va., and sales offices will be located in the General Motors Building, Detroit.

STUTZ SHIPMENTS INCREASE

INDIANAPOLIS, Oct. 10—Stutz Motor Car Co. of America reports an increase in actual shipments in September over August of 33 1/3 per cent.

Smaller Tire Makers Protest Cutting Lists

Appeal to Attorney General—Reported That a Landis-Hayes Is Imminent

CHICAGO, Oct. 9—Discussion at the monthly meeting today of the Midwest Rubber Manufacturers Association centered around the protest filed recently with the United States Attorney General by Thomas Follen, president of the association, against price reductions by large tire manufacturers.

Considerable attention was given also to a report that large tire interests in New York City are working on a plan for the appointment of an arbiter who would be to the tire industry what Judge Landis is to baseball or Will Hayes to motion pictures.

It was revealed at the meeting that, acting on advice of certain members, Follen recently telegraphed to Attorney General Daugherty, declaring that the Midwest members feel the sole object of the recent price cut is to eliminate the smaller plants completely, and calling upon him to take action that would avoid the extermination of the small tire manufacturers.

The Attorney General's office, it was disclosed, acknowledged receipt of the complaint and stated that upon receipt of a full statement of facts evidencing any agreement to fix prices or otherwise restrain trade, with names and other details, it would immediately give the matter its attention.

Concrete Evidence Lacking

I was admitted by Follen and other members that concrete evidence of any such agreement as that complained of was lacking, and a number of the members declared they did not believe any such agreement existed. The matter was disposed of with the understanding that Follen have the representative in Congress from his district lay before the Attorney General such facts as he might hereafter be able to obtain.

Members of the Midwest Association had only meager reports of the movement to select an arbiter, and none of them were active participants in the move. They were not certain any good could be accomplished by such an arrangement, and they were extremely doubtful that it could be consummated.

A report was in general circulation among the members that plans for another price reduction had been made by one of the largest manufacturers. It was understood that this reduction was to have been made effective Oct. 15, but that it had been abandoned because of the opposition by banking interests.

Red Ball to Extend Plant for New Truck

Will Manufacture It in Stewart Wire Wheel Factory Which It Bought in May

INDIANAPOLIS, Oct. 11—The Red Ball Transit Co. of this city is producing its new 3-ton truck in the Stewart wire wheel factory at Frankfort, Ind., which it acquired in May of this year. In view of the new production the plant, which has been used as a general service station for overhauling of the Red Ball Transit trucks, will be extended to provide double the space now afforded. Other than the truck, the company will produce a new taxicab. Both will be priced at $2,200.

Has Four-Wheel Brakes

The truck will have four wheel brakes and be manufactured of standard parts. The specifications include a Waukesha engine with a 4⅜ bore and 5¾ stroke which is rated at 45½ hp. Force feed oiling is employed. A Wisconsin worm drive rear axle of 10,000 lb. rated capacity with Timken wheel bearings and optional gear ratio is provided. The gearset is a covert four-speed, 3½-ton size with 1½-in. gears, and a 10-in. M. & E. single dry disk clutch is used. The drive is through fabric universal joints, using 2¼-in. tubular drive shafts. The front axle is a Continental heavy type with ball bearing steering head, and the steering gear is a Ross wheel type with controls under the wheel.

The four-wheel brakes are 17 x 3 on the front with 20 x 2½ rear service with a 16 x 2½ rear emergency. Frame members are 7 x ¼ in. channel steel. The frame is hot riveted and there are five cross members with an angular rear cross brace. Van steel eight spoke wheels are fitted, and the tires are 36 x 10 in. dual rears with 36 x 5 in. solids in front. The standard wheel base is 174 in. with 192 in. optional.

Sales Will Be Direct

The chassis price is $2,200. In general these trucks will be sold to fleet owners and operators directly from the factory. Fitted with standard Red Ball Transit furniture bodies, these trucks will also be sold to individuals who wish to contract with the Red Ball Transit hauling business to operate as have the Red Ball Transit trucks of the past.

The taxicabs will be sold exclusively to taxicab operating companies, who will operate lines of taxicabs and use this type of equipment exclusively. It is said that several contracts have already been entered into with such taxicab operators, who about the first of the year will announce that they will do business under the Red Ball name. The right to use this name is part of the contract for the purchase of taxicabs. Sale will be made to owner-operators.

The truck and taxicab manufacturing business of the company is a department of the old company that has conducted the Red Ball overland hauling for three years. W. B. Hiner, president and majority owner of the stock of the incorporated company will have general oversight of both divisions.

George W. Person, general manager and in charge of production, for many years has been known as one of the old timers in the truck operating field, and is said to have been one of the very first engaged in that field in New York. Robert L. Hiner is assistant general manager. The Central Service Corp., Indianapolis, has general charge of engineering.

It is said that no stock has been sold or distributed to the general public, and that practically all not held by Hiner has been bought by members of the organization. Less than 10 per cent of the stock has been so distributed to members of the organization and company officials.

Hiner says that the fundamentals of the truck design of the new production were arrived at from a study of data of Red Ball operation covering three years in all parts of the country east of the Mississippi River and to the Atlantic Coast. The twenty offices of the company which have handled the business and directed the fleet of Red Ball trucks which now number 1200, have been able to collect a complete set of figures of truck operation, costs, service and relative data regarding serviceability of parts and units of 3-ton trucks.

Diameter of Crankshaft Increased in Duesenberg

DETROIT, Oct. 11—Material improvements have been made in the appearance of the Duesenberg for 1924. The cars are distinguished by two color paint combination with individual striping of distinctive design.

Mechanically the only important change is the increased diameter of the crankshaft which is now 2¼ in. instead of 2 in. The front compartment has been made cooler by running the exhaust pipe forward instead of back.

A new passenger phaeton has been added. This is a high side type with the tire at the rear and no trunk. It has extremely deep upholstery, the depth being 11 in. in the back and 15 in. for the seat. The car has been designed to offer the utmost in comfort and carrying capacity. It has 134-in. standard wheelbase and the Rubay built body is so laid out that trunks can be carried on the side if desired. The price is $6,500.

Another new body is the Imperial sedan. This is also a Rubay job, featured by piano-hinged door, dropping glass behind the driver's seat. The body has seven-passenger capacity and may be had in various color combination stripings. The four-passenger, four-door coupe has been modified to give 2 in. more in the front compartment and 3 in. more in the back. It sells at $7,500.

Bus Transportation Expanding in South

August and September Made Records in Number of New Lines Established

ATLANTA, GA., Oct. 10—That the motor bus transportation industry this year will experience the greatest period of development in the history of that industry in the South is shown in reports that have been received in Atlanta during the past two months. More new bus lines were established in the various southern states in August and September than during any previous two months since the industry first began to develop in this section.

This has been made possible by several million dollars' worth of road construction work that has been carried out this year in Georgia, Florida, Tennessee and the Carolinas.

This has resulted in the formation of a number of new motor bus companies in these States and establishment of additional lines so that it is now possible to cover virtually every important town and city in the extreme Southeast by motor bus.

The principal development of recent months has been in the Carolinas and in the eastern part of Tennessee, with several new lines in North Georgia, and a number along the eastern and western coast line of Florida.

In the purchase of new buses and equipment this year the industry in the Southeast has made an investment of some hundreds of thousands of dollars, and due to the general agricultural prosperity of the district is expected to continue at this rate of development for the rest of the present year. During the present year there have been approximately twice as many new bus lines established in the South as during any previous year, covering approximately twice the mileage.

New Models Announced by Wills Sainte Claire

DETROIT, Oct. 10—Two new models, each on a 127-in. wheelbase chassis, have been added to the Wills Sainte Claire line.

The Gray Goose Special is a five-passenger sport model which includes a trunk, rear vision mirror and windshield wiper as standard equipment. The seven-passenger phaeton is built on the same chassis two slats which fold into the back of the front seat being located in the rear compartment.

Option of five colors is allowed on both models, prices being identical at $2,875. Other than the increased wheelbase the mechanical details of the new models are the same as those of the previous models.

Casing Inventories Declined in August

Production Increased as Compared with July — Gain Shown Also in Shipments

NEW YORK, Oct. 8—Figures compiled by the Rubber Association of America show increasing production of pneumatic casings, inner tubes and solid tires during August as compared with July.

During that month there was also a gain in shipments and a falling off in inventory.

The following table shows inventory, production and shipments for all of 1922 and for eight months of this year.

PNEUMATIC CASINGS

1922	No. Mfrs. Reporting	Inventory	Production	Shipments
January	66	4,174,216	2,055,134	1,596,806
February	66	4,691,329	2,084,308	1,562,365
March	63	5,183,286	2,645,790	2,073,963
April	65	5,464,336	2,401,187	2,086,651
May	65	5,523,095	2,721,503	2,639,273
June	64	5,042,147	2,838,890	3,133,260
July	63	4,834,106	2,476,636	2,695,095
August	63	4,629,392	2,905,209	3,029,823
September	64	4,612,037	2,504,744	2,502,106
October	64	4,682,958	2,674,662	2,588,770
November	62	4,964,976	2,733,134	2,379,708
December	59	4,599,208	2,656,942	2,934,079
1923				
January	62	4,695,916	3,127,270	2,994,297
February	60	5,224,387	3,217,987	2,588,639
March	58	5,670,601	3,865,726	3,332,637
April	56	6,088,272	3,539,326	2,976,160
May	57	6,906,594	3,659,986	2,757,764
June	55	7,040,600	2,956,943	2,502,185
July	54	6,471,124	1,992,989	2,539,425
August	58	6,058,387	2,355,915	2,807,432

INNER TUBES

1922	No. Mfrs. Reporting	Inventory	Production	Shipments
January	66	5,246,647	2,343,393	1,889,724
February	65	6,141,956	2,596,774	1,702,583
March	63	6,991,118	3,017,511	2,090,737
April	65	7,230,096	2,650,573	2,329,343
May	65	7,189,552	2,970,696	2,938,947
June	64	6,186,534	3,130,629	3,973,679
July	63	5,675,839	3,068,199	3,630,744
August	63	5,207,228	3,808,224	4,220,055
September	64	5,164,757	3,501,442	3,558,971
October	64	5,488,033	3,787,758	3,420,680
November	61	6,210,053	3,850,908	3,075,023
December	59	5,732,125	3,411,074	3,825,949
1923				
January	62	5,838,310	3,951,885	3,748,651
February	60	6,771,958	4,039,202	3,001,697
March	57	7,740,945	4,875,414	3,828,315
April	55	8,394,184	4,259,558	3,535,635
May	57	9,292,223	4,317,537	3,414,115
June	54	8,924,326	3,590,011	3,581,060
July	52	7,527,281	2,666,354	3,942,247
August	53	6,950,578	3,577,922	4,304,034

SOLID TIRES

1922	No. Mfrs. Reporting	Inventory	Production	Shipments
January	11	181,769	40,224	33,294
February	11	183,448	39,492	36,805
March	11	182,197	49,433	48,350
April	11	173,748	46,664	52,309
May	11	170,904	57,640	60,711
June	11	169,808	66,089	63,408
July	11	176,375	71,505	60,425
August	11	189,698	84,313	69,435
September	11	200,016	82,767	66,797
October	11	213,942	85,480	71,275
November	11	234,684	85,775	61,466
December	10	244,061	77,221	64,570
1923				
January	11	262,462	83,343	60,611
February	11	270,191	75,457	63,394
March	11	265,843	79,788	77,144
April	10	260,631	71,468	72,609
May	10	268,323	77,288	67,147
June	10	283,425	72,445	52,126
July	10	263,891	42,345	45,219
August	10	262,810	48,141	45,925

"Production" and "Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipment" includes only stock forwarded to a purchaser and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

Nash Declares Position Is Best in Its History

KENOSHA, WIS., Oct. 11—Although not expecting his factory to produce automobiles at capacity rate during the fall months, C. W. Nash, president of Nash Motors Co., looks for a very satisfactory fall business and splendid business during the winter and spring.

In connection with the announcement that the net income of the company for the quarter ending Aug. 31 was $2,257,766, Nash declared his company's business is in the strongest position it has ever been in. Net income for the nine months ending Aug. 31 was $6,399,414, it was announced. In figuring net income, deduction was made of expenses of manufacture, depreciation, selling and administrative expense and taxes.

The board of directors declared the regular quarterly dividend of $1.75 a share on the preferred stock, payable Nov. 1 to stockholders of record Oct. 19.

Liquidation Retarded of Climax Rubber Co.

COLUMBUS, OHIO, Oct. 11—Hugh K. Martin, trustee in bankruptcy of the Climax Rubber Co., forced into bankruptcy six months ago, has been unable to make much progress toward a settlement of the company's affairs.

Complications in the way of legal difficulties with the Canadian Climax Co. and also a company licensed in Michigan are holding up liquidation. The Canadian contract provided that it should receive the benefit of all improvements to the product of the company which manufactured and exploited a puncture proof compression tube.

Some improvements have been made by the Michigan company and the Canadian corporation demands the benefit accruing from them.

Meese & Gottfried Co. Acquired by Link-Belt

CHICAGO, Oct. 9—The Link-Belt Co. of Chicago has purchased the Meese & Gottfried Co. of San Francisco, Los Angeles, Seattle and Portland, for forty years manufacturer of power transmission and distributor of conveying and transmission machinery on the Pacific Coast.

The new organization will be known as the Link-Belt Meese & Gottfried Co., with headquarters in San Francisco and other plants and warehouses in Los Angeles, Seattle and Portland.

The officers are: Charles Piez, chairman of the board; B. A. Gayman, president; Harold H. Clark, vice-president and sales manager; Leslie W. Shirley, treasurer, and Richard W. Yerkes, secretary.

Plan for Used Cars to Be Nationalized

Percy E. Chamberlain Heads Organization That Will Establish Motomarts

DETROIT, Oct. 6—Percy E. Chamberlain has launched an organization to nationalize the Appleby Plan Motomarts. With the assent of dealers, either through associations or through joint action in communities having no associations, he proposes to organize Motomarts to take over the present used car end of retail automobile selling on a self-sustaining basis.

The Appleby plan, now in operation in twenty-five cities on the Pacific Coast, places the acceptance and sale of used cars in the hands of the Motomarts. Warehouse receipts are given for cars accepted, negotiable on new car purchases and acceptable at banks as security for loans at 50 per cent of their face value.

Offices Opened in Detroit

Associated with Chamberlain in the undertaking are Paul F. Brophy and James E. Appleby, the originator of the plan and formerly a dealer and factory representative. Offices have been established in Detroit from which will be directed the work of installing the Appleby plan throughout the country where dealer associations or groups of dealers desire it installed.

Following Chamberlain's announcement at a meeting of trade association directors, business, press representatives and dealers and distributors, the purpose of Chamberlain and his associates will be announced in business papers, and a direct campaign launched to carry the Appleby message to every community in which automobiles are sold. Brophy will leave at once to carry the message of the associates to dealer associations in the West and Appleby will make a similar trip through the eastern territory.

Lines of Conduct Standardized

It is proposed to establish in a community a Motomart in charge of a specialist selected and trained by the national headquarters, who will be responsible for the success of the mart in his territory. A system of supervision will be maintained by a field organization which will report to headquarters. Every Motomart will be operated upon standardized lines governing appraisals, sales methods, advertising appeal, etc. The colors orange and black have been selected as a symbol.

In signing for the establishment of a Motomart in any community, dealers will be parties to a contract under which they will agree to discontinue accepting trade-ins and to pay 1 per cent of the gross receipts of the Mart to the Cham-

(*Continued on page* 766)

Standard to Handle Sales of Ethyl Gas

General Motors Makes Arrangements with Indiana Subsidiary of Oil Company

DETROIT, Oct. 9—The General Motors Chemical Co. has entered into a contract with the Standard Oil Co. of Indiana for the distribution of ethyl gas, in the eleven States covered by this Standard Oil subsidiary.

Ethyl gas is the new synthetic fuel developed by the General Motors Research Corp., which has the effect of taking the knock out of engines, no matter under what conditions an automobile is driven. It is the result of several years of research and test at the General Motors Laboratories in Dayton and has been successfully demonstrated in use in Dayton and Cincinnati, where it has been on sale at a number of gasoline stations over the past several months. Ethyl gas has a light wine color, which distinguishes it from other automobile fuels.

Distribution by the Standard Oil Co. of Indiana will cover the States of Indiana, Michigan, Illinois, Minnesota, Wisconsin, Iowa, Missouri, Kansas, Oklahoma, South Dakota and North Dakota as quickly as installation can be made. This installation will be started in Indiana and carried through Illinois into Missouri and Kansas.

The southern part of the distributing territory is being equipped this winter and the northern part will be equipped as early as possible in the spring. All stations are expected to be in operation in this territory by July 1 next.

There are 968 cities and towns in the eleven States mentioned where one or more Standard Oil service stations are operated.

Bulk distribution facilities exist in 4088 towns. The service stations now being operated by the Standard Oil Co. of Indiana total 1851, and these cover thoroughly the most important cities.

Durant's "Liberty Bank" Opens Doors in New York

NEW YORK, Oct. 10—The formal opening of the Liberty Bank in New York, founded by W. C. Durant, took place today. It is located at 250 West Fifty-seventh street in the Fisk building. The president of the bank is Carroll F. Downes, who also is president of Star Motors and who was a Philadelphia banker before joining the Durant interests. Downes is the only automobile executive outside of W. C. Durant, who is chairman of the board, connected with the new bank.

TO MAKE HIGH SPEED STEELS

MILWAUKEE, Oct. 8 — Manufacture and sale of high speed steels and tools made from the metal is the object of two new Milwaukee corporations just organized. The Jolite Co., Inc., capitalized at 1000 non-par common shares, will manufacture the steel, and the Jolite Tool Co., with 1000 non-par shares and $10,000 preferred stock, will manufacture the tools. The principals are members of Williams, Cole & Wolff, Inc., manufacturers' representative, Milwaukee, and include Dean R. Williams, George M. Wolff and Cyrus L. Cole.

Flint Being Produced at Plant in Michigan

FLINT, MICH., Oct. 8—Production has started on the Flint Six in its new plant in this city, the first car being turned out Oct. 1 by the Flint Motor Co. Heretofore the Flint has been made at Long Island City, which will continue to supply the Eastern demand. The Western marketing will be under the control of the Flint office here. Eastern distribution will be handled through the Locomobile Co. of America.

The local plant is of reinforced concrete construction and is a single building with one main structure and three wings.

Nameplate Identifies Car as G. M. C. Product

NEW YORK, Oct. 9—Hereafter all cars manufactured by the various units of the General Motors Corp. will carry a distinctive scroll or ribbon under the nameplate, reading "Product of General Motors." The reason for the adoption of this is given as follows by President A. P. Sloan, Jr.:

"The manufacturing divisions have shown they are members of the family by a line under their signature, which reads 'Division of General Motors Corp.' The manufacturing members of the family have placed their individual trademarks upon their product, but there has been no emblem of identification linking together all the products, thereby indicating they are members of the family."

Hamilton-Beach Company Purchased by Scoville

RACINE, WIS., Oct. 8—Scoville Manufacturing Co., Waterbury, Conn., has acquired the entire interests of the Hamilton-Beach Manufacturing Co., Racine, Wis., which manufactures fractional horsepower motors, electric tools and electric appliances.

Fred J. Osius, founder of the Racine company, some time ago expressed a desire to retire from active business and devote his time to extensive real estate holdings at Miami, Fla., where he has a winter home.

There will be no change in name or policy in Hamilton-Beach. E. O. Goss has been elected president; T. M. Myers, vice-president and general manager; A. T. Druse, secretary-treasurer, and J. V. Montague, assistant secretary. Goss and Myers are executives of the Scoville company.

The Racine plant employs between 400 and 450 operatives.

Cause of Standards Explosion Set Forth

Board of Inquiry Blames Leakage of Feed Pipes or Flooding of Carburetor

WASHINGTON, Oct. 8—A leakage of the feed pipes or the flooding of the carbureter are believed to have been responsible for the escape of the gasoline which caused an explosion in the dynamometer laboratory of the Bureau of Standards.

In its preliminary report, the board of inquiry investigating the explosion, says:

The explosion was caused by the ignition of a mixture of gasoline vapor and air in the altitude chamber. The research under way was concerned with comparative tests of fuel of differing volatility, and aviation gasoline was under test at the time.

The board believes that the presence of the gasoline vapor in the chamber was due either to a leak in the feed line leading to the carbureter of the engine or to a leak from the carbureter due to the sticking of the float mechanism.

This conclusion is supported by a remark made by one of the members of the testing staff an instant before the explosion, to the effect that the gasoline readings which he was taking indicated the presence of a leak.

The board believes that not more than a quart of gasoline could have escaped into the chamber, which amount, however, if vaporized, would have been sufficient to account for the energy of the explosion.

S. A. E. Section Adjourns, Respecting Blast Victims

WASHINGTON, Oct. 8—The regular meeting of the Washington section of the Society of Automotive Engineers scheduled for Friday was postponed out of deference to the four scientists killed in the Bureau of Standards explosion.

A meeting of the board will be held this week and the schedule of the section rearranged in order to provide a place for last Friday night's discussion.

Engine Valves Form S. A. E. Discussion

(*Continued from page* 759)

of this ability is attributed to the retention of a high percentage of exhaust products in the fresh charge as the volume of exhaust gas which remains in the clearance space and the portion between the poppet valve and transfer valve is returned with the incoming stream.

Emphasis was laid on the features of fuel economy and full range performance in all three papers, particular stress being placed on the absence of service and adjustment requirements. Attention was also drawn to the possibilities of higher speed operation because of positive valve operation.

Pan-American Road Conference Planned

Delegates Will Visit United States Next Month for Preliminary Study

WASHINGTON, Oct. 8. — Definite plans for the Pan-American Motor Road Conference will be mapped out when representatives of the automotive and allied industries meet here next month. The preliminary work is now under way to bring approximately forty Pan-American delegates to this country for a three weeks' intensive study of highway transportation. Great interest is manifested by the automotive industry in these tentative meetings which are scheduled for May or June, 1924, because of the influence on foreign sales.

It is expected that organizations of bankers and machinery manufacturers will participate in the arrangements. There was a general agreement among the various industries interested in the project that little or no time should be devoted to "paper-reading" conferences.

The representatives of the automotive and highway industries have suggested that three weeks be devoted to intensive study of highway transport. It is hoped that the delegates will be composed of engineers and economists, in other words, experts having a practical knowledge of the situation in their respective countries. Wherever possible, the Pan-American delegates will study conditions which are analagous to those in their own countries. These men will be taken to sections of the country where highways have been built or are under construction on soil comparable to that of South America.

Will Study Manufacturing

The automotive manufacturers will arrange for a short but intensive study of actual manufacturing conditions and other details of interest to the delegates.

In discussing the significance of meeting, J. Walter Drake, Assistant Secretary of Commerce, declared:

The rapid increase in motor transport in this country has brought with it many new and diverse problems which will have to be faced all over the world as the use of the motor vehicle is extended.

The proposed conference will give South Americans an opportunity to see the mistakes which we have made as well as perhaps a better understanding of the profound influence exerted on economic and social life by modern highway transport. At the same time we will gain a better understanding of their problems, hence I believe that the conference will be a mutual benefit to all concerned.

WEEKS COMPANY BANKRUPT

MILWAUKEE, Oct. 8—Weeks Manufacturing Co., manufacturer of auxiliary carburetion devices and thermostatic specialties, has filed a voluntary petition in bankruptcy. The principal creditor is the Clum Manufacturing Co., manufacturer of automotive equipment specialties, which produced the merchandise sold by the Weeks company. There are no assets. The first meeting of creditors has been called for Oct. 12.

General Motors Making New 1-Ton Truck Model

DETROIT, Oct. 8—General Motors Truck Co. is now in production of its 1-ton model with a 150-in. wheel base, which is priced at $275 above the list on the standard 1-ton model. This model has been added, the company notes, to meet the needs of any prospect desiring a long chassis for the hauling of light goods, but the 1-ton capacity has not been changed.

The stake platform body which has been added to the 1-ton express body line is listed at $140 painted in the standard deep green. The company advises that it can be obtained in the lead for $110. The body is constructed of selected hardwood and measures 108 in. The width inside dimension is 67 in. From the floor to the top of the stakes is 34¼ in. Malleable post sockets are used and signboards on the side are of wood covered with sheet steel.

Gray Motor Producing Special Phaeton Model

DETROIT, Oct. 8—The Gray Motor Co. is in production on a new special phaeton model, mounted on the regular chassis, which is listed at $625. The car is finished in dark maroon, with khaki top, nickel radiator and windshield stanchions and has a gold stripe about the body. The fenders, splashes and chassis are in black. The car comes equipped with motometer.

President F. L. Klingensmith has declared that the company does not contemplate any change in prices. Production is continuing at about 100 cars daily and the company looks forward to continuing at much this rate through the winter.

With the new special touring, Gray is now building six-passenger models.

PYRENE'S APPEAL DENIED

NEW YORK, Oct. 9—The Circuit Court of Appeals has denied the petition of the Pyrene Manufacturing Co. for a re-hearing of the appeal in the decision handed down to the United States Circuit Court of Appeals last July in the case of the Moto-Meter Co., Inc., and Harrison Boyce vs. the Pyrene Manufacturing Co.

FORD BUYS GAGE COMPANY

DETROIT, Oct. 10—Ford Motor Co. announces that it has purchased the holdings of the Johannson Gauge Co., maker of precision gages, with home offices in Sweden and an American plant in Poughkeepsie, N. Y. Ford executives would not state what will be done with the purchase.

Men From Industry Meet With Coolidge

Advisory Committee from N. A. C. C. Later Confer with Secretary Hoover

(*Continued from page* 758)

be no doubt but that Federal Aid, while not a considerable factor from a financial standpoint, has had a tremendous influence in heightening the standards of highway construction in this country.

In the Department of Interior, the cooperative enterprise between the Bureau of Education and the Highway Education Board, a quasi-governmental organization, already has done much toward providing the nation with some of the thousands of trained men who will ultimately be needed to carry on the work of highway transport both here and abroad.

In connection with the work of this committee the industry is contributing $12,000 annually to the cost of national essay contests on safety, and last year 500,000 children participated. The Highway Education Board has charge of these and similar activities which we as motor car manufacturers believe to be of paramount importance to the public welfare.

The development of new means of transport for the Army and Navy is a contribution to the national defense which we are helping to the best of our ability, and we are similarly interested in the uses of transport in peace time activities by the Post Office Department and other agencies of the Government.

Following the session, the committee went to the Department of Commerce, where in consultation with Secretary Hoover, Assistant Secretary J. Walter Drake, Dr. Rowe, director of the Pan-American Union, T. H. MacDonald, chief of the Bureau of United States Public Roads, and Dr. William G. Sherwell, Inter-American High Commission, tentative plans were discussed and indorsed looking forward to invitations to the several Pan-American countries to send delegates to this country for a three weeks' study of highway transport.

In the evening Drake entertained the committee at dinner, which was also attended by four members of President Coolidge's cabinet.

Chicago and New York Bus Makers May Merge

NEW YORK, Oct. 10—In financial circles it is reported that negotiations are pending for the consolidation of the Fifth Avenue Coach Co. of this city and the Yellow Cab Manufacturing Co. of Chicago, which would result in the creation of a powerful bus construction company.

The Fifth Avenue Coach Co. is devoting most of its manufacturing efforts to building buses for the New York Transportation Co., with which it also is affiliated and which operates the Fifth Avenue bus lines. The Yellow Cab Manufacturing Co. is the parent concern building Yellow taxis.

Plan for Used Cars to Be Nationalized

Percy E. Chamberlain Heads Organization That Will Establish Motomarts

(*Continued from page* 763)

berlain associates. Where there are trade associations these will receive one-half of the 1 per cent for activities incidental to the establishment and maintenance of the marts in their territories.

Associations requesting a speaker to address them on the feasibility of locating a Motomart in their community will pay $50 to national headquarters to insure active interest. Dealers without associations will be required to post $500 for the same reason, the money in both cases to become part of the organization expense of locating a mart.

Trained Specialists Available

Chamberlain said that in addition to his associates, there are already a number of trained specialists who are available for call by any dealer group or association. Managers for the Marts will be selected from the best men now engaged in used car work and will be given special training for the work.

For the success of the plan it was asserted that it is not necessary that all dealers in any community participate. Experience in cities in which it is now operative has shown that dealers not participating in the plan have come into it soon afterward.

Of the Appleby plan itself, the basic principles were shown as follows:

Cars are taken in at an appraisal based upon the actual condition of the car. Repairs necessary for conditioning are noted and the owner required to pay these. The owner also is assessed 10 per cent for selling expense. The car is then conditioned in the service station of the dealer representing that line in that community, and is sold by the Motomart at a price based on the appraisal.

Provision for Orphan Cars

Turning in his car the owner gets a warehouse receipt. When the car is sold this is redeemed. Orphan cars and unrepresented cars are conditioned in a reliable general shop. The Motomart does not maintain a shop. The number of salesmen will depend upon the potential business. At no time will the Motomart carry more than a 30-day supply of cars, this being based on the number sold the month previous and general seasonal and economic conditions.

By leaving the dealer free entirely for the sale of new cars, new car business has been increased in most cases where the plan has been operated. Where there was less new car business this was more than compensated by the money saved in handling used cars. To an extent the Marts will control new car business in that these will not move faster than the Mart is able to handle the used ones. Some new car business will be delayed through dealers not offering owners premiums for trading in their old cars.

The principal asset of the Appleby plan to the trade, it was asserted, will be the establishment of responsibility for used cars. Confidence will be established among used car buyers if convinced they are doing business with a reliable organization, selling cars in declared condition at a fair price.

Speaking of the attitude of manufacturers regarding the plan, Chamberlain said he had no fear of opposition after the plan was understood.

"If we are going to be penalized because we follow good practices it is a sorry condition."

It will have the effect of placing production on a sound economic basis, he said. Cars will be sold entirely on their merits and the merits of their selling organizations, and upon the ability of the public to buy. This latter, it was pointed out at the meeting, is the only saturation point that the industry has to consider.

Rolls-Royce of America Files Year's Statement

SPRINGFIELD, MASS., Oct. 8—Rolls-Royce of America, formed under the laws of Delaware, has filed with the Massachusetts Commissioner of Corporations this statement, bearing date of May 10, 1923:

ASSETS.

	1923	1922
Real estate	$ 519,299	$ 530,465
Machinery and tools	1,203,587	1,315,584
Prepared expenses	.....	12,058
Merchandise	1,644,286	1,378,635
Automobiles, trucks, teams	8,970	.....
Notes	21,563	3,982
Accts. receiv	283,057	187,128
Cash	32,895	57,828
Unliquidated exps	.....	529,756
Profit and loss	.....	791,553
Patents, good will	1,531,977	4,316,190
Total	$5,245,634	$9,125,179

LIABILITIES.

Capital stock	$3,675,000	$7,100,000
Mortgages	37,702	.....
Funded debt	1,879,000	1,700,000
Purchase contract	.....	40,301
Accounts payable	739,995	164,012
Notes payable	.....	10,605
P. & L. deficit	1,086,063	.....
Adv. collections	.....	26,467
Acc., wages, etc	.....	83,794
Total	$5,245,634	$9,125,179

More Persons Employed in Cleveland Factories

CLEVELAND, Oct. 11—Automobile producing companies in this city made a striking recovery during September from their loss of nearly 7 per cent in number of employees during August.

Figures of the Chamber of Commerce show that eighteen concerns manufacturing automobile and accessories increased their pay rolls 6.7 per cent during September.

A. A. A. to Formulate Gasoline Price Plan

Executive Board of Association Will Convene in Washington on October 24

WASHINGTON, Oct. 8—Plans and a definite program for a reduction in the price of gasoline will be formulated at a special meeting of the Executive Board of the American Automobile Association in Washington on Oct. 24. According to announcement of Thomas P. Henry, president of the association, the board will complete a legislative program to urge upon Congress, which will include a sweeping investigation of the inequalities in prices of gasoline and the apparent unfair prices which are being charged in some locations.

Henry declares that the association is convinced that Congress has the only power to obtain the information on which a real solution of the gasoline problem can be based.

In calling the meeting, Henry expressed himself as being impressed with the definite results which many of the clubs are obtaining in reducing the percentage of automobile accidents to the number of motor vehicles.

The committee will also seek some comprehensive program of cooperation with the 300 affiliated clubs in assisting local traffic authorities in the solution of their traffic problems.

Decline in Gasoline Stocks

WASHINGTON, Oct. 8—A survey by the Bureau of Mines, Department of the Interior, indicates a diminution of the nation's gasoline stocks on Sept. 1. On that date the figure was 1,053,856,221 gallons, representing a forty-seven days' supply, as compared with 1,165,389,340 gallons, or a fifty-four days' supply, on Aug. 1. Stocks on Sept. 1 of last year amounted to 703,738,310 gallons, or a thirty-seven days' supply.

Production in August amounted to 648,954,706 gallons as compared with 637,000,000 gallons in July and 550,000,000 gallons in August, 1922. Domestic consumption during August amounted to 692,185,610 gallons, an increase of 18,000,000 gallons over the July consumption and an increase of nearly 109,000,000 gallons over August of last year. Exports in August were 78,503,475 gallons, a decrease of 5,000,000 gallons from the July figures, but an increase of 50,000,000 gallons over August of last year.

The number of operating refineries reporting to the Bureau of Mines in August was 260, with an aggregate daily indicated crude oil capacity of 2,055,532 barrels.

Kerosene production was 186,218,819 gallons, a decrease of 2,000,000 gallons from the July production but an increase of 2,000,000 gallons over August, 1922.

Light Car Continues Popular in Britain

At Same Time, Buying Shows Progression from Smaller Vehicle to Larger

LONDON, Sept. 30 (*by mail*).—Now that the expected falling-off in orders and deliveries has occurred in the British passenger car trade it is of interest to review the conditions that have prevailed since the Olympia Show last November. It may be said at once that the waning of the demand for even the smallest of light cars which was expected in some quarters has not taken place.

Those makers who introduced larger and supplementary models after having specialized upon the 10 hp. (67 cu. in.) type have found, for the most part, that the last mentioned has maintained its position, while those—of which Austin and Humber are prominent examples—who brought out additional models of 7 hp. or 8 hp. with four cylinders have experienced a demand for these beyond their expectations.

Austin to Increase Output

Humber has been behind with deliveries of its 8 hp. car right up to the end of July, while Austin is planning a largely increased output of its "seven" in 1924.

It is true that a great many people who previously had used nothing larger than a 10 hp. two-passenger car have deserted this type and gone in for a twelve or fourteen with either two-seated or four-seated open body. But their places have been filled by newcomers, the latter to a great extent being people who previously had been motorcycle and sidecar owners.

By no means can it be said that the 10 hp. light car has had its day. Singer, which was the originator of this type in 1909-1910, has just finished another successful year and is extending its plant. The small "six" put into production this year forms but a fraction of this firm's output, which consists mainly of 67 cu. in. engined two and four-seaters.

Morris Biggest Producer

The biggest output of any individual maker has been Morris, who in the spring of this year took over the Coventry plant of the Hotchkiss Co., previously making Morris power plants under contract. Approximately 25,000 Morris cars with identical chassis but with different size engines (94 and 104 cu. in.) have been sold since last October and an output of 50,000 is being planned for 1924 at greatly reduced prices. These cars are smaller in wheelbase and track than some other makes with 67 cu. in. engines and are decidedly within the light car category.

If one considers relative increases in demand the 12 and 14 hp. types with a four-cylinder engine can be held the most popular, for not only have they opened a new field but they have also attracted buyers from smaller and larger cars.

Nevertheless, there has been an increase in the popularity of sixteens and twenties—known as "full sized" cars—for there exists a gradual tendency for replacements to be favored in a larger class. The 10 hp. man has been buying 12 hp. cars; the previous 12 hp. user has gone in for a 14 hp., and the 14 hp. owner has, when finance permitted, bought a "full sized car."

But simultaneously the first-time buyer and the motor cyclist have gone mainly toward the lower end of the scale and thus maintained the demand for the eights and tens.

It can be said that 1923 has not indicated that any particular size of British car is likely to be superseded or become a discredited type. If it were possible to obtain definite figures it would probably be found that apart from the Morris output the 10 hp. type has found more buyers than any other size of British production during 1923.

As regards bodywork, the demand for sedans has increased perceptibly and there are now one of the standard types with most makers, being fitted to all sizes of chassis from 12 hp. and up. There is no indication as yet that the sedan will form more than, if as much as, 10 per cent of the body output next year, though there are one or two makers who prophesy that it will be in the majority before many years have passed.

Plant for Sedan Bodies Only

One maker (Standard) has established an entirely separate plant for manufacturing nothing but sedan bodies.

Experiments have been proceeding continuously with various systems of construction, the aim being to reduce the cost of production to something much nearer that of the open body with a folding top, if not actually to be able to offer both types at a uniform price.

The majority of makers, however, believe that the open car with a folding all-weather top will continue to be the most popular. Considerable improvement, taking various forms in different examples, is likely to be found in all-weather tops at this year's show.

Dunlop Makes 1000 Tires Daily at Buffalo Factory

BUFFALO, Oct. 10—More than 1000 tires daily are being produced at the plant of the Dunlop Tire & Rubber Co. in this city, the increased production making possible wider distribution.

The company states that it is rapidly approaching the state of nation-wide distribution, with wholesale branches recently opened in Milwaukee, Atlanta, Chicago, Seattle and Los Angeles. These centers, in addition to those previously established, are said to take Dunlop into practically all the important tire-using States of the country.

Price Cuts at Show Expected by British

Belief Is Based on Action Taken by Manufacturers Since First of Year

WASHINGTON, Oct. 9—Speculation on the tendency of prices for new models is absorbing the attention of the British automotive industry with the approach of the annual automobile show in November.

It is the consensus that drastic price cuts may be expected at the show. This belief is based upon the fact that a number of manufacturers have reduced prices since the first of the year, together with lowering tire and fuel costs.

Considerable publicity has been given the development of the four-wheel braking on new models of American and English cars.

British automobile manufacturers and dealers are manifesting great interest in the road vehicles bill which is now being drafted by the Ministry of Transport with a view to its introduction during the autumn session of parliament. The principal object of the bill is to abolish the present 20-m.p.h. speed limit, in place of which there will be severe penalties for dangerous driving.

According to a report received by the Automotive Division of the Department of Commerce here, British manufacturers have been successful in marketing the small light car. There has been some discussion in England as to the possibilities of price cutting on these models, as the cost of materials has increased to some extent and, with some exceptions, there has not been that improvement in the distributive side of the trade which should so reflect itself in production as to warrant a reduction in prices.

Ford Buys Florida Site for Distributing Plant

JACKSONVILLE, FLA., Oct. 9—The Ford Motor Co. has purchased a ten-acre site on the Jacksonville waterfront, and though definite details of the company's plans have not been announced, it is stated a large distributing plant will be constructed at an early date, and probably an assembling plant later. The initial investment planned will be about $250,000.

May Build at Rock Island

ROCK ISLAND, ILL., Oct. 8—Appearance here of two representatives of the Ford Motor Co. stirred rumors in realty circles that the company was seeking a site for an assembling plant for its Middle Western trade.

The plant, it is reported, will employ between 12,000 and 15,000 men and women to assemble parts for distribution throughout this territory.

Curtiss Plane Wins Pulitzer Air Trophy

Lieut. Williams Covers Course at St. Louis at Rate of 243.67 M.P.H.

ST. LOUIS, Oct. 8—Forced by adverse weather conditions to postpone the airplane meet three days, the promoters of the aerial speed battle met with success in staging a sensational program that concluded Saturday with the Pulitzer trophy race. That race was won by Lieutenant A. J. Williams, who maintained an average speed of 243.67 m.p.h. over a triangular course of 200 kilometers, breaking all official world air speed records. Williams flew a Curtiss (fighter) plane.

The card on the opening day started with the Flying Club of St. Louis trophy for commercial planes which was won by Walter E. Lees in a Hartzell FC-1 plane. The Mitchell trophy race was taken by Lieutenant Burt E. Skeel, who covered the 200 kilometer course in a Wright engined MB-3 at 146.5 m.p.h. The Army won the first three places in the race for the Liberty engine builders' trophy, the victor being Lieutenant C. Mullen in a Fokker, who traveled 300 kilometers at 139.03 m.p.h.

In Friday's competition the Aviation Country Club of Detroit trophy for civilian pilots was won by Jack Atkinson in a Bellanca air sedan at 94.28 m.p.h. Lieutenant H. L. George of the Army Air Service won the Merchants' Exchange of St. Louis trophy at 50 kilometers at an average of 114.28 m.p.h. flying a five year old Martin bomber.

There were only two contests on Saturday, the last day of the meet. The Pulitzer trophy of course was the chief event, the other being a 300 kilometer event for air mail pilots for the Detroit News trophy. This was won by Pilot J. F. Moore of North Platte, Neb., who averaged 124.98 m.p.h. Fourteen contested, all the planes being De Havilands equipped with the original Liberty engines manufactured during the war by the Packard company.

Jury in Alabama Indicts Former Preston Officers

BIRMINGHAM, Ala., Oct. 10.—Three former officials of the Preston Motors Corp. of Birmingham, now in the hands of the receiver, have been indicted by the Jefferson County grand jury for violation of the Alabama blue-sky law. They are: Ross Skinner, president; James T. Driver, sales manager, and Preston Orr, secretary-treasurer.

A circular in connection with the floating of a $100,000 bond issue, it is alleged, was mailed to stockholders in which it was stated that additional capital was needed for increased production and to bring out a new model. This was said to be a misstatement of the facts.

One point made, it is said, was that the Preston corporation stated that it made the Premocar, when it is charged it only assembled it. The production of the company was cited from the time it was formed as evidence of the alleged inaccuracy of this statement, figures showing that the company turned out twenty cars in 1919, 103 cars in 1920, 232 cars in 1921, and 95 cars in 1922; the figures for 1923 were not available.

The corporation was formed March 8, 1919, with a capital stock of $10,000,000. Stock was sold in Alabama to the extent of approximately $1,000,000, it is alleged, and other small sales of stock were made. It is claimed in the indictments that the company was never on a paying basis.

FINANCIAL NOTES

C. H. Carlisle, vice-president of the Goodyear Tire & Rubber Co., says in a preliminary statement that the final report on the fiscal year which ended Sept. 30 will show approximately cash on hand of $400,000; reserve, $1,700,000; and surplus after payment of dividends, $1,500,000. The net earnings should approximately double the requirements for yearly dividends. The net sales will show, in dollars and cents, an increase over the previous year, and in units a very material increase. It is said the company has no fixed or banking indebtedness and has discounted all bills.

Motor Wheel Corp., in tax reports filed at Lansing, shows that on June 30 it had a surplus of $2,657,993, total assets of $13,619,-63€ and that common stock issued amounted to $4,455,010 and preferred to $2,001,600. **Durant Motors of Michigan,** in its tax reports, shows surplus of $2,217,104 on the same date; assets of $8,835,034 and stock issued of $3,289,160 of which $2,242,720 is common. Both companies paid the maximum tax of $10,000.

Nash Motors Co. reports net income for the third quarter of $2,257,766, after deductions. The report also shows that net income for the nine months' period was $6,399,-414. The regular quarterly dividend of $1.75 a share was decared on preferred stock, payable Nov. 1 to record holders of Oct. 19.

F. A. Seiberling's Notes Extended for Two Years

CLEVELAND, Oct. 8—A. V. Cannon, attorney for the creditors, announces that a two years' extension has been given for payment of claims against F. A. Seiberling. In making his announcement, Cannon states that the Seiberling Rubber Co., of which Seiberling is president, is not involved, but that the claims are entirely personal to Seiberling.

Seiberling became involved in financial difficulties during and after the World War, and as a result the Prudential Securities & Realty Co. was formed to take over his personal assets and liabilities. Approximately $6,000,000 in notes were issued, maturing in two years from Aug. 1, 1921.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

The prevailing tone in commodity markets was distinctly improved last week. Stock prices registered a slight net gain, although considerable irregularity is still evident.

Professor Irving Fisher's index of wholesale commodity prices last week rose two points to 157, the highest level reached since June. Bradstreet's food index stood at $3.31 as against $3.28 the week before and $3.23 a year ago. Both Dun's and Bradstreet's monthly index numbers were higher in September, the former advancing 1½ per cent to $190.827 and the latter 1.3 per cent to $13.0974.

Discounts by the Federal Reserve banks increased $19,700,000 during the week ended Oct. 3, bills secured by Government obligations declining $2,000,000 and "other bills discounted" increasing $21,700,000.

Loans of reporting member banks during the week ended Sept. 26 declined $15,000,000. Loans secured by Government obligations increased $13,000,000, while loans secured by stocks and bonds declined $20,000,00 and "all other" loans declined $8,000,000. Investments declined $19,000,000 and net demand deposits $128,000,000.

Call loan rates were slightly easier last week, opening at 5½ per cent on Tuesday, easing off to 4, and then rising steadily to 5½ on Monday of this week. Time loan rates were firm at 5½ per cent for all but the shortest maturities, which moved at 5¼.

Industry Producing in Conservative Way

(*Continued from page* 756)

dication of the condition of the industry for that month. While sales dropped from the records of the unusually high months of the spring and early summer they advanced from $48,536,700 in July to $50,264,100 in August, an increase of 3.5 per cent. A decrease is noted in total outstanding notes.

Parts plants are active, with substantial orders booked and delivery specifications pressing makers to heavy operations.

The truck branch of the industry is moving forward, but, as in other months, the advance is not particularly marked, caution continuing to be the prevailing note in operations. The conservatism being shown is placing this branch on a firm basis. Output probably will continue the forward movement through the remaining months of the year. But production is expanding as greater use is being made in various parts of the country of this medium of transportation.

Tire Trade Will Talk Consumer Price List

Spring Dating Also Will Be Taken Up at Meeting of National Association

NEW YORK, Oct. 8—In the call sent out for the annual convention of the National Tire Dealers Association, to be held at the Pennsylvania Hotel in this city Nov. 13 to 15, President George J. Burger has broadened the scope of the meeting by extending an invitation to all tire dealers, regardless of whether they are members of the association, because of the importance of the questions and problems to be discussed.

Burger says:

One of the important points dealers are interested in expressing themselves on is the elimination of the consumer's price list, distributed by manufacturers. At previous N.T.D.A. conventions this subject has been considered but there always has been a difference of opinion as to whether the price situation would be improved by the discontinuance of the list.

Some dealers hold that the list served only as a basis for discount and demoralized the price situation rather than stabilized it. Others contended that it established a standard of tire value. In view of several manufacturers withdrawing their lists recently, this subject should develop some interesting discussions.

Spring dating is another subject. Again the dealers hold different views, those in certain sections declaring that it is necessary if they are expected to carry stocks over the dull months in expectation of the opening of the selling season. Among manufacturers the feeling is expressed that spring dating can be continued without detrimental effects to the dealer or the manufacturer, if it is properly handled and not taken advantage of as the means of overstocking the retailers.

With the addition by some of the large companies of several lines of tires permitting them to offer a casing in three price classifications, it is expected that an effort will be made to have dealers handle all three grades of tires to obtain the company franchise.

Now that the standard manufacturers can offer a casing for every price requirement, it is expected that they will object to the practice followed by the dealer in the past in handling the first line of the standard company as a lead to the sale of other makes of tires at lower prices.

Movement Takes Place in Spring Tire Dating

(*Continued from page* 756)

that the same terms should be extended to dealers in all parts of the country.

Following is the letter which gives the recommendations in detail:

In giving consideration to spring dating practices, your executive committee was guided by a desire to make recommendations that insofar as possible would serve equally the interests of all concerned in the matter, i. e., the tire manufacturer, dealer and the public, and, therefore, the committee believes that the specific recommendations given below represent a step forward with respect to soundness and fairness in this important phase of tire distributing:

1. That the soliciting and accepting of spring dating orders be limited to the spring dating period, i. e., the period from Oct. 15 to the last day of February, both inclusive, in this connection it is suggested that each company refrain from issuing its spring dating plan to its sales organization until the beginning of the spring dating period.
2. That every effort be made to prevent overloading of dealers upon spring dating orders. It is believed that this can best be accomplished by the solicitation of but one spring dating order from any one customer, and by close supervision of credits.
3. That the present practice of granting protection against loss in the event of price decline up to May 15 on spring dating business be continued.

It was the unanimous recommendation that on account of the ample and constant service available to dealers in cities, also because of public demand during the fall and winter season being very little below the summer period, every effort should be made to solicit business in cities on much shorter terms than are extended in other territory.

In view of the widely different climatic conditions existing in different parts of the country it was the view of the executive committee that it is unsound and unfair to apply the same spring dating terms to all alike. Accordingly, it was further recommended that the country be zoned in accordance with the attached memorandum, which memorandum gives, also, the recommended dates of shipment and payment for each zone as follows:

1st—FLORIDA ZONE. Soliciting of business to commence Oct. 5. Make shipments after Oct. 15. Payment due Feb. 10, or January, February and March.

2nd—SOUTHERN ZONE. (Southern border or Coast States outside of Florida, including California). Shipments after Oct. 15. Payment due April 10 or March, April and May.

3rd—MIDDLE ZONE. (Everything north of Southern Zone up to Northern Zone). Middle section of the country. Shipments after Oct. 15. Payment due May 10, or April, May and June.

4th—NORTHERN ZONE. (Line drawn from lower part of Maine through Mineapolis to Montana western border). Shipments after Feb. 1. Payment June 10, or May, June and July.

INDUSTRIAL NOTES

Prime Manufacturing Co., Milwaukee, manufacturer of brass and alloy castings for the automotive and railroad industries, contemplates the erection of a new foundry with a floor space ranging between 15,000 and 16,000 sq. ft. The additional facilities are to be available about Jan. 1, if satisfactory arrangements can be made for construction and equipment. Orton L. Prime is president and general manager.

Moore Drop Forging Co. of Springfield, Mass., and Chicopee, Mass., has purchased the plant and business of the Storms Drop Forging Co. in Springfield and will operate it to take care of its increased volume of business, mainly consisting of the manufacture of automobile parts. Several additions have recently been built at the Moore company's Chicopee plant.

Koehring Co., manufacturer of gas engines, concrete mixers, paving machines, etc., plans another large manufacturing addition to its plant in Milwaukee.

METAL MARKETS

Price concessions have been found to be a flat failure as a means of speeding up buying at this juncture of the steel market by the few small producers who have tried it. This price shading in no instance exceeded a few dollars per ton, but sellers very quickly came to see for themselves that what business came to them at these slightly reduced prices would just as surely have been theirs at full prices. Of course, there has been no real, worth while slashing of prices in any case, merely here and there an attempt on the part of an order-hungry sales manager to beat his competitors to it on what under prevailing conditions is looked upon as an inviting tonnage, in the hope that no one would learn about it.

News travels fast, however, in the steel market, and some of those who, in a few isolated instances, went $2 or $3 per ton under what is generally looked upon as the market have been given to understand that they were playing with fire. No one can less afford a real price war at this time than the smaller producers, because of high labor and raw material costs. For a time several hot-rolled strip mills were reported to cut under the 3.00 cent minimum, but this has come to a halt. Black sheets are probably the outstanding commodity in which price shading continues more or less in evidence.

At that, there are fewer mills selling black sheets at 3.75 cents, Pittsburgh, than the fingers on one hand, and there are probably many times that number booking routine business every day at 3.85 cents. The leading interest adheres closely to the 3.85 cent price level. In fact, the chief producer as well as the larger among the independents appear committed to a firm policy of price maintenance for the time being. From this it may be deduced that so far there is no business in sight that might be expedited by a change in the market. The best that the larger steel interests seemingly hope for over the year's remainder is a continuance of sufficient routine demand to maintain operations at somewhat near the prevailing rate.

The sheet subsidiary of the Corporation is reported to have sufficient orders on hand to maintain operations until the first week in December. Unless something unforeseen happens, the market is quite likely to drag along in its present form until very close to the end of the year, and consumers appear not in the least eager for a change from this condition. The more far-seeing steel buyers know from experience that declines brought about in times of slow demand, such as the present, are very apt to result in artificially magnified advances when the first sign of reawakening in the demand sets in.

Pig Iron.—The market continues weak, with foundry and malleable nominally quoted at $24.50, but sellers generally conceding that a $24 price might be very easily obtained on any sort of a near worth-while tonnage. Further banking of furnaces is looked for and producers generally pin their faith rather on a curtailment of output than any early revival of demand from melters.

Aluminum.—Lack of fresh demand and absence of selling pressure are neatly paired in the present-day aluminum market. Holdings of metal in the outside market are light. The conviction is gaining ground that no matter what the ultimate outcome of the Ruhr muddle may be, Germany has been removed effectually as a market factor.

Copper.—Light demand for brass and copper products is noted, copper wire being about the most active item on the list. The market is feeble.

Calendar

SHOWS

Oct. 17-27—New York Electrical and Industrial Exposition, showing electric trucks, cars, parts and accessories, Grand Central Palace.

Nov. 4-10 — New York, First Automobile Exposition of the Foreign Automotive Association, Hotel Astor.

Nov. 11-17—New York, Annual Automobile Salon, Hotel Commodore.

Nov. 12-17 — Chicago, Annual Business Exhibit and Convention of the Automotive Equipment Association, Coliseum,

Jan. 5-12 New York, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Eighth Coast Artillery Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.

Jan. 26-Feb. 2—Chicago, Annual Automobile Salon, Hotel Drake.

Chicago .....Feb. 4-9 Tenth Annual National Motorcycle, Bicycle and Accessory Show, Broadway Armory, under the auspices of the Motorcycle and Allied Trades Association, A. B. Coffman, secretary.

FOREIGN SHOWS

Oct. 15-20—London, Motorcycle Show, Olympia.

Oct. 24-Nov. 2—Paris, Trucks, Agricultural Tractors, etc., Grand Palais.

Nov. 1-15—Buenos Aires, Annual Automobile Exposition, under the direction of the Automovil Club Argentino.

Nov. 2-10—London, Automobile Show, Olympia.

Nov. 22-Dec. 1—London, Motor Transport Exhibition.

Dec. 8-19—Brussels, Passenger Cars, Trucks, Airplanes and Motor Boats, Aviation Palace.

RACES

Oct. 28—Barcelona, Spain, Grand Prix for vehicles of 1500 c.c.; Nov. 1, International Grand Prix for cycle cars of 1100—Nov. 4, International Grand Prix for two liter.

CONVENTIONS

Oct. 8-15—Atlantic City, Convention of Electric Railway Association.

Oct. 24-26—Cleveland, Thirtieth Annual Convention of the National Association of Farm Equipment Manufacturers, Hotel Statler.

Oct. 25-27—Lake Mohonk, N. Y., Mountain House, Semi-Annual Meeting of the American Gear Manufacturers Association.

Nov. 21—Annual Meeting, Motor Truck Industries, Inc., Place of Meeting Not Decided.

Jan. 24-31 — Chicago, Annual Convention and Show of the American Road Builders' Association, the former to be held in the Congress and the latter in the Coliseum.

May, 1924—Detroit, International Motor Transport Congress under the auspices of the National Automobile Chamber of Commerce.

S. A. E. MEETINGS

Oct. 18—Metropolitan Section, Brakes, H. M. Crane, Automobile Club of America, 247 West Fifty-fourth Street, New York City, 8 p.m., Dinner 6:30 p.m.

Oct. 25-27—Production Meeting of the S. A. E.—Cleveland.

Oct. 29—Buffalo Section, Problems in the Construction of Low-Pressure Tires, J. F. Palmer, Statler Hotel, Buffalo, 8 p.m.

Oct. — Cleveland Section — No Meeting in October Because of National Production Meeting in Cleveland Oct. 25-27.

Nov. 15—Metropolitan Section, Commercial Air Travel, C. W. Warner.

Dec. 13—Metropolitan Section, Vehicles for Package Delivery.

Jan. 22-25, 1924—Annual Meeting of the S. A. E.—Detroit.

Feb. 14, 1924—Metropolitan Section, Vehicle Depreciation.

March 13, 1924 — Metropolitan Section, Replacement Parts and Accessories.

April 17, 1924—Metropolitan Section, Fleet Maintenance, F. W. Winchester.

May 15, 1924—Metropolitan Section, What Roads and Steels Do to Automobiles.

Sales in August Fell, Reserve Board Finds

WASHINGTON, Oct. 2—Despite a decline in the distribution of automobiles during August, the automotive industry shows a steady and wholesome growth in production and distribution as compared with last year, according to the monthly survey of the Federal Reserve Board.

Reports received by the Board from twelve Reserve districts show that production in basic industries declined 2 per cent during August, and was at the lowest point for this year.

The August output of these basic industries, however, was 27 per cent larger than a year ago, and production in every month this year has been at a higher level than in any month of the previous five years. The lower production index in August reflected reduced output, after a correction for the usual seasonal trend, of pig iron, woolen goods, flour and cement.

Railroad freight shipments were larger in August than in any previous month on record. This was due to a seasonal increase in shipments of coal, miscellaneous merchandise, and agricultural products.

In commenting on the automotive industry, the Reserve Board has the following to say:

After declines during June and July, the production of automobiles and trucks again increased in August. The figures, however, indicate that activity was not quite at the high rate noted during the unusually active spring months; in fact, the increase during August may be partly attributed to a larger number of working days than in July, as a similar trend has been noticed in previous years.

Nevertheless, cars are still being produced and shipped in large volume, and the output during the first eight months of this year exceeded the total output of 1922, a record-breaking year.

Price reductions were announced during August and September by a number of manufacturers on both low and high priced cars, and in several instances cars are now selling at very close to previous minimum prices. New models recently placed on the market are said to have evoked greater interest on the part of buyers.

Reports to the Chicago and St. Louis Federal Reserve Banks from dealers in the Middle West indicated a decline in the distribution of automobiles during August as compared with July. The number of new cars sold by both retailers and wholesalers and the sale of used cars all participated in this decline.

Sales by wholesalers were less in number than during August, 1922. Stocks of new cars on Aug. 31 were greater than those held on July 31, 1923, and on Aug. 31, 1922. Production of automobile tires and tubes declined substantially during July, although shipments were somewhat larger than during the preceding months. One large tire manufacturer has recently announced price reductions on tires for Fords.

Buick Sets New Record in Shipments of Cars

DETROIT, Oct. 10—Buick Motor Co. reports September, with shipments of 19,651, the largest month the company has had in its history. A new record in a single day's shipment was set Sept. 26 when 1018 cars left the factory.

The largest previous month was May this year with 19,502. The prospect for continued good business during fall and winter is declared excellent, and October shipments are expected to exceed September, as dealer demand continues in heavy volume.

Detroit Registered 350 Gain Last Month

DETROIT, Oct. 10—New cars registered in Detroit in September totaled 5619, a gain of 350 over August, according to the report of the Detroit Automobile Dealers Association. The open car total of 2854 was about 100 more than closed cars. Truck deliveries of 495 were 30 more than August business.

Ford deliveries in the month were 2680, open cars exceeding closed by 150. This was a gain of about 100 over August. Chevrolet ranked second with 690, also gaining 100 on August. Overland and Gray, in the low priced field, were also slightly higher than August with Star showing a falling off.

Buick with 481 was 130 higher than August and led the middle priced field. Studebaker with 233 was slightly under the August total. Dodge Brothers gained from 88 to 122. Willys-Knight gained from 91 to 153. Somewhat smaller gains were registered by most of the medium priced makers except those whose deliveries are tied up by new models.

In the higher priced lines Cadillac showed the influence of new models with an increase from 31 to 67. Packard gained from 28 to 45, Lincoln from 12 to 20 and Peerless from 15 to 26.

There was one electric sale to two in the month previous.

Ford delivered 300 trucks and five tractors. Other leading light truck deliveries were Chevrolet 33, Reo 26 and Dodge Brothers 20.

In the heavy duty field Federal delivered 13, Standard 12, Gotfredson 11 and Fifth Avenue 11.